TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 15.407

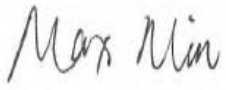
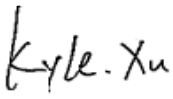
TEST REPORT

For

Shanghai Sunmi Technology Co.,Ltd.

Room 605, Block 7, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai 200433 China

FCC ID: 2AH25FW010

Report Type: Original Report	**Product Type:** Wireless Router	
Test Engineer:	Max Min	
Report Number:	RKSA190613001-00D	
Report Date:	2019-07-31	
Reviewed By:	Kyle Xu RF Leader	
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn	

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shanghai Sunmi Technology Co.,Ltd.
Tested Model	FW010
Product Type	Wireless Router
Dimension	230mm (L)*166mm (W)*50.2mm(H)
Power Supply	AC100~240V

**All measurement and test data in this report was gathered from production sample serial number: 20190613001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2019-06-13)*

Objective

This type approval report is prepared on behalf of *Shanghai Sunmi Technology Co.,Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AH25FW010.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Kunshan).

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01), the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

In **5150~5250 MHz** band, test channel list is as below,

802.11a/802.11ac20/n20 mode Channel 36, 40, 48 were tested.
802.11n40/802.11ac40 mode Channel 38, 46 were tested.
802.11ac80 mode Channel 42 was tested

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

For 5725~5850 MHz band,

802.11a/802.11ac20/n20 mode Channel 149, 157, 165 were tested.
802.11n40/802.11ac40 mode Channel 151, 159 were tested.
802.11ac80 mode Channel 155 was tested.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	159	5795
151	5755	161	5805
153	5765	165	5825
155	5775	/	/
157	5785	/	/

For Conducted Test:

802.11a: each transmit chains were tested
802.11ac: each transmit chains were tested
802.11n: each transmit chains were tested

For Radiated Test:

For 802.11a: SISO for each transmit chain
For 802.11ac: MIMO for two transmit chains
For 802.11n: MIMO for two transmit chains

EUT Exercise Software

RF test tool: QRCT

The worst case was performed under:

5150MHz-5250MHz Band:

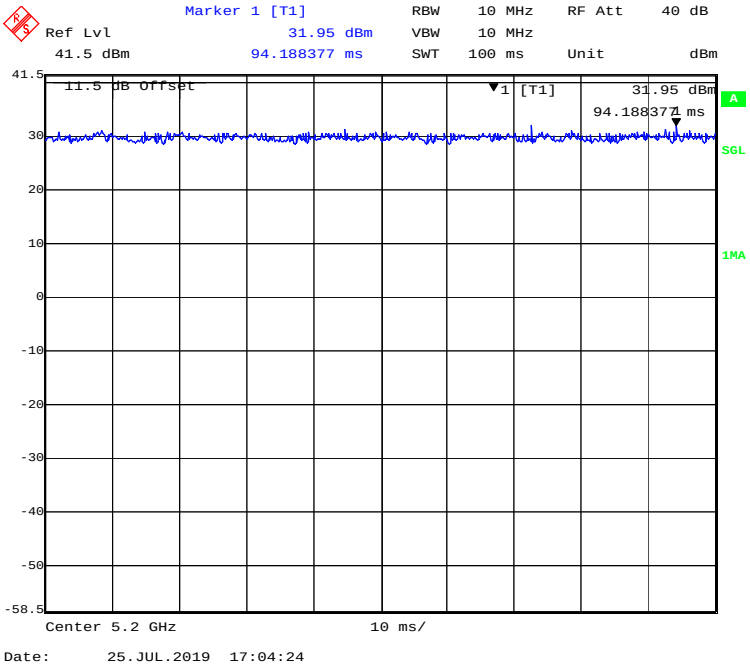
Mode	Data rate	Channel	Power level	
			Chain 0	Chain 1
802.11a	6 Mbps	5180	22	24
		5200	24	24
		5240	24	24
802.11ac20	MCS0	5180	21	21
		5200	22	22
		5240	22	22
802.11n-HT20	MCS0	5180	21	21
		5200	22	22
		5240	22	22
802.11ac40	MCS0	5190	18	18
		5230	23	23
802.11n-HT40	MCS0	5190	18	18
		5230	23	23
802.11ac80	MCS0	5210	16	16

5725MHz-5850MHz Band:

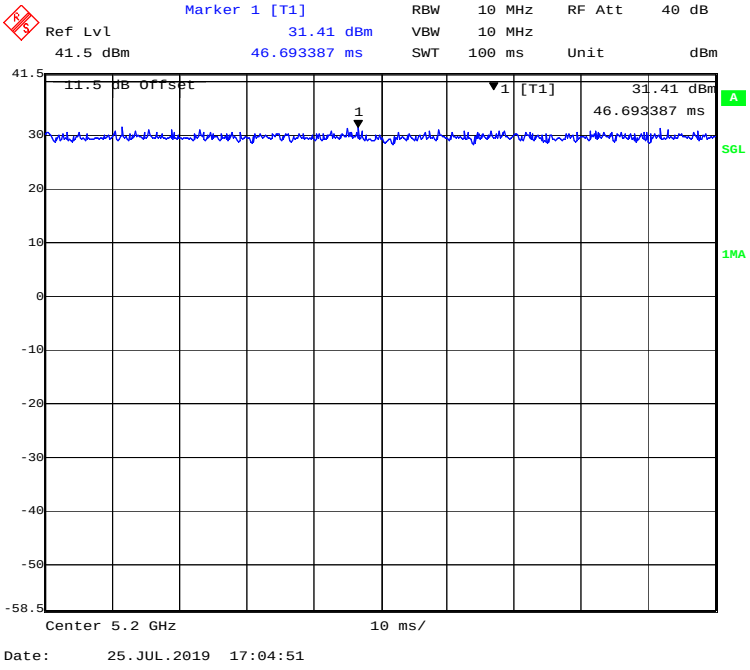
Mode	Data rate	Channel	Power level	
			Chain 0	Chain 1
802.11a	6 Mbps	5745	24	24
		5785		
		5825		
802.11ac20	MCS0	5745	24	24
		5785		
		5825		
802.11n-HT20	MCS0	5745	24	24
		5785		
		5825		
802.11ac40	MCS0	5755	23	23
		5795		
802.11n-HT40	MCS0	5755	23	23
		5795		
802.11ac80	MCS0	5775	20	20

Duty Cycle
5150MHz-5250MHz Band-Chain0:

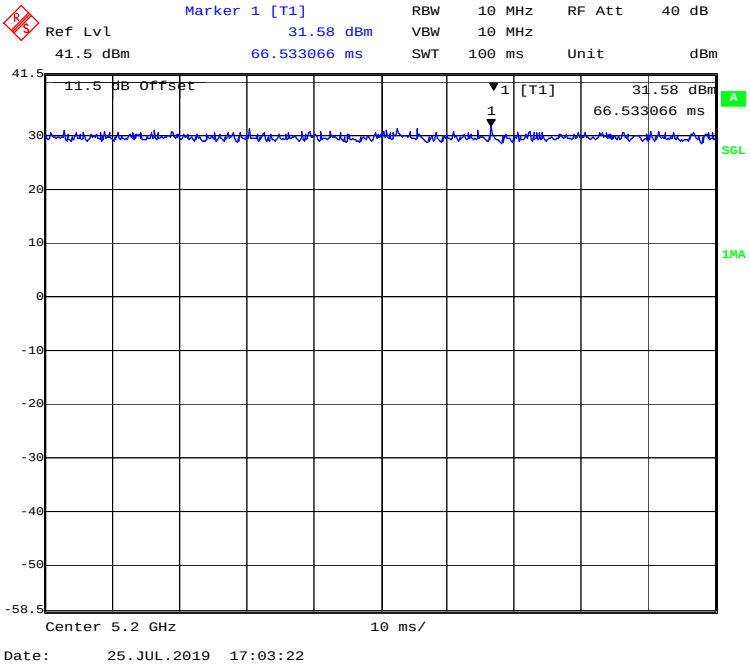
802.11a mode



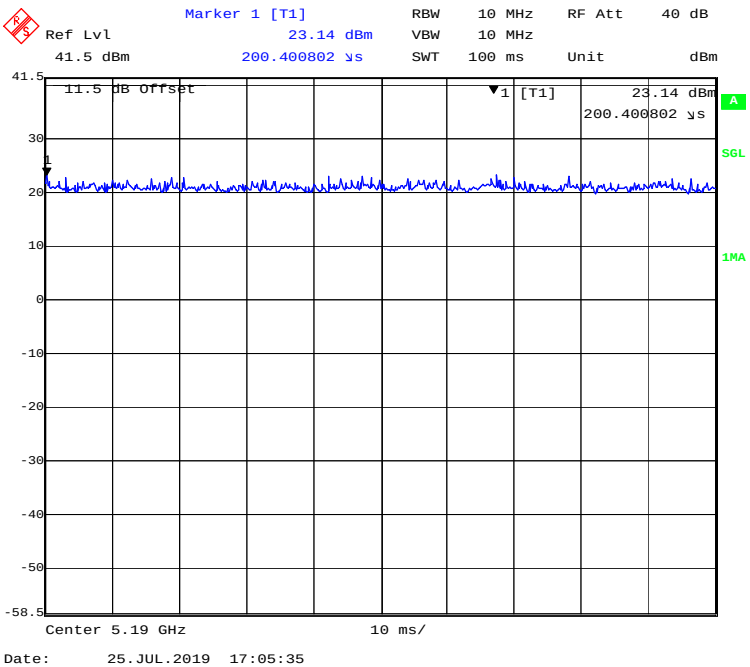
802.11ac20 mode



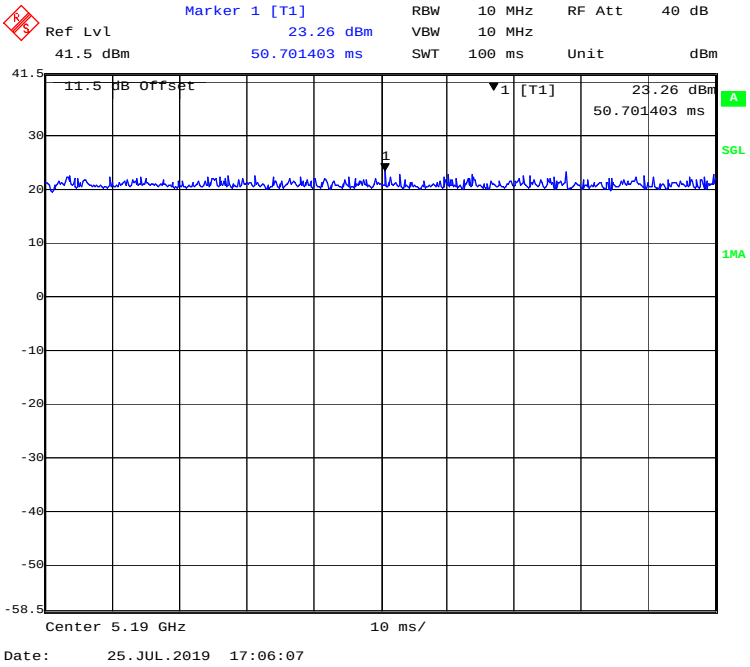
802.11n-HT20 mode



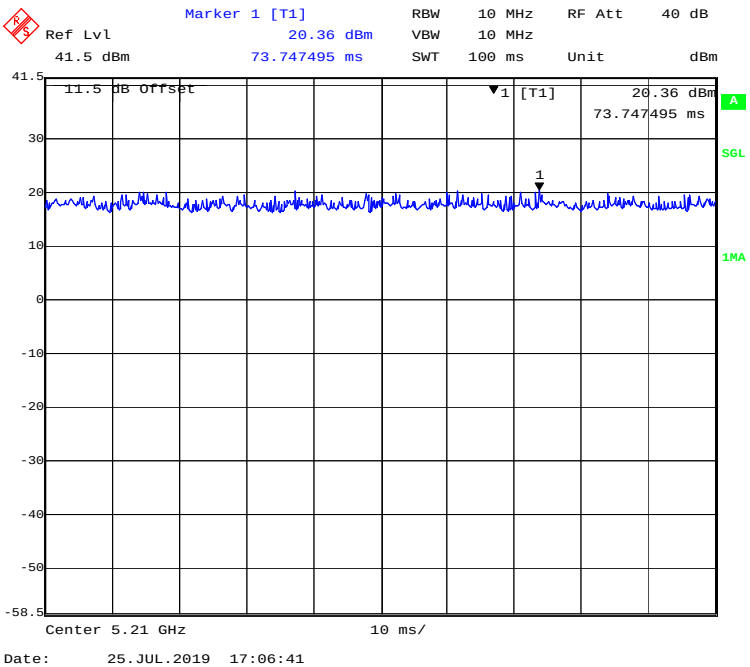
802.11 ac40 mode



802.11n-HT40 mode

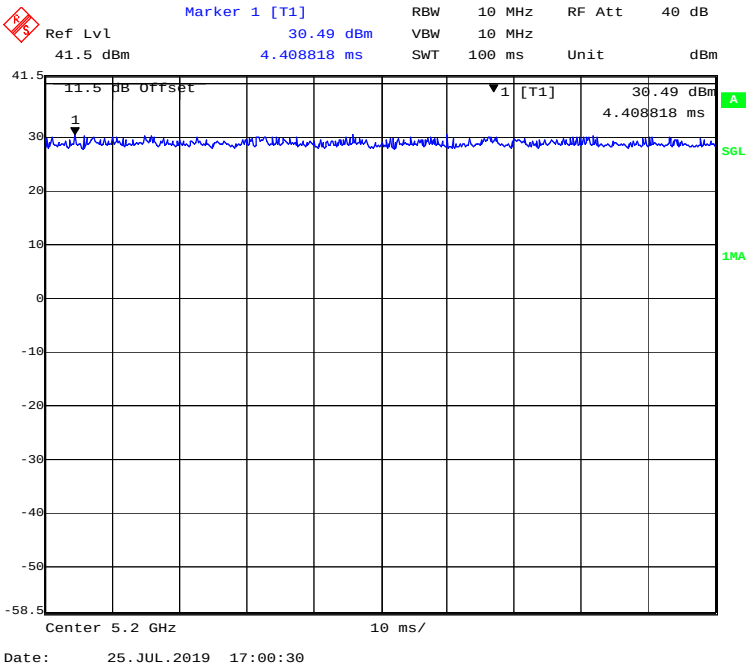


802.11 ac80 mode

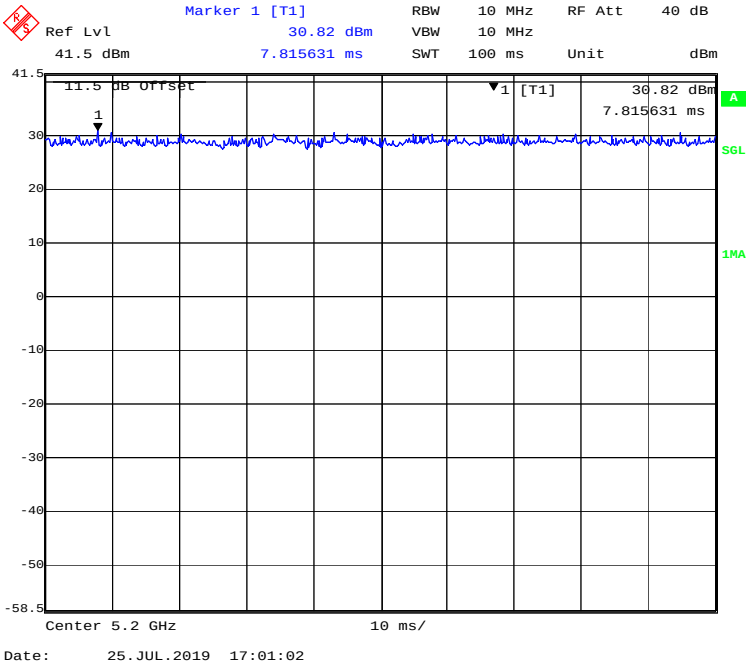


5150MHz-5250MHz Band-Chain1:

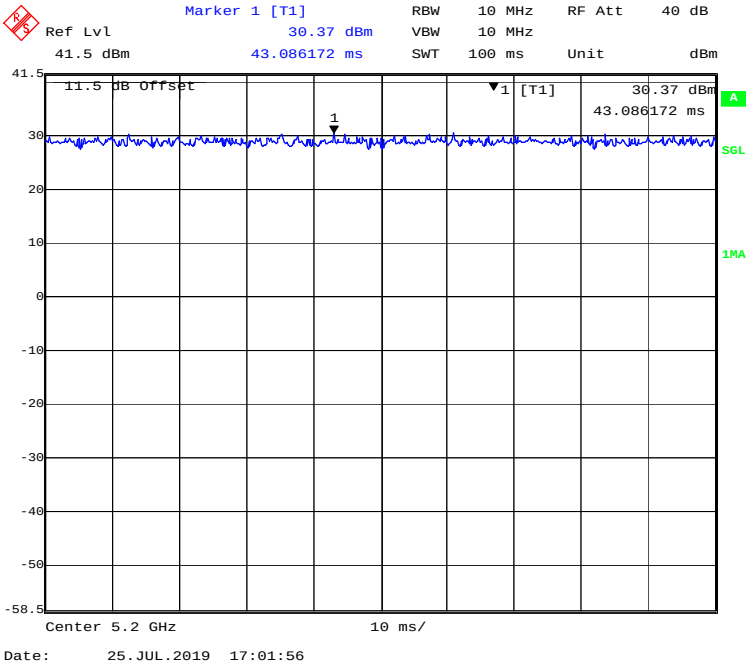
802.11a mode



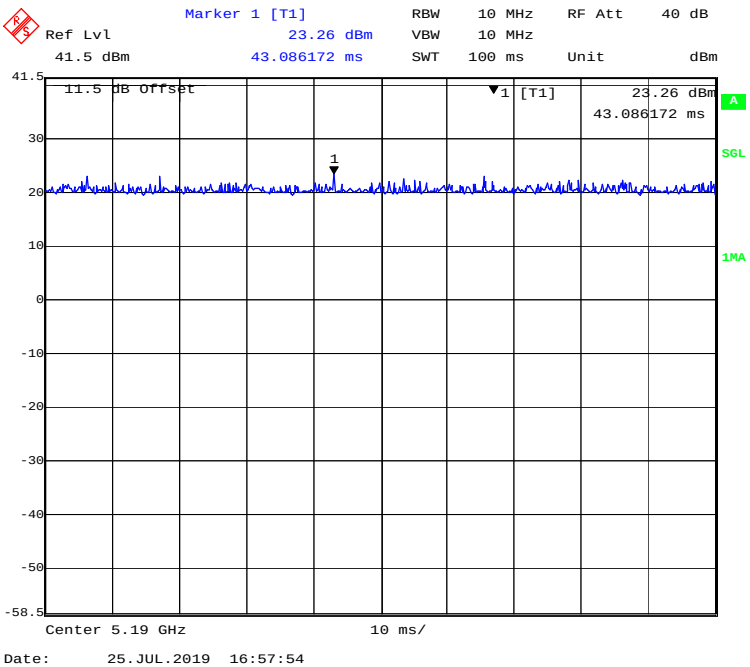
802.11ac20 mode



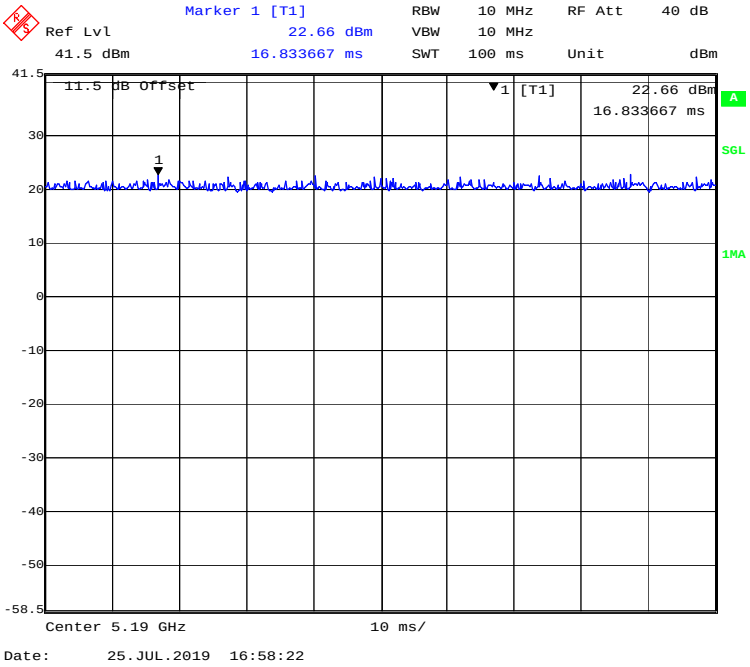
802.11n-HT20 mode



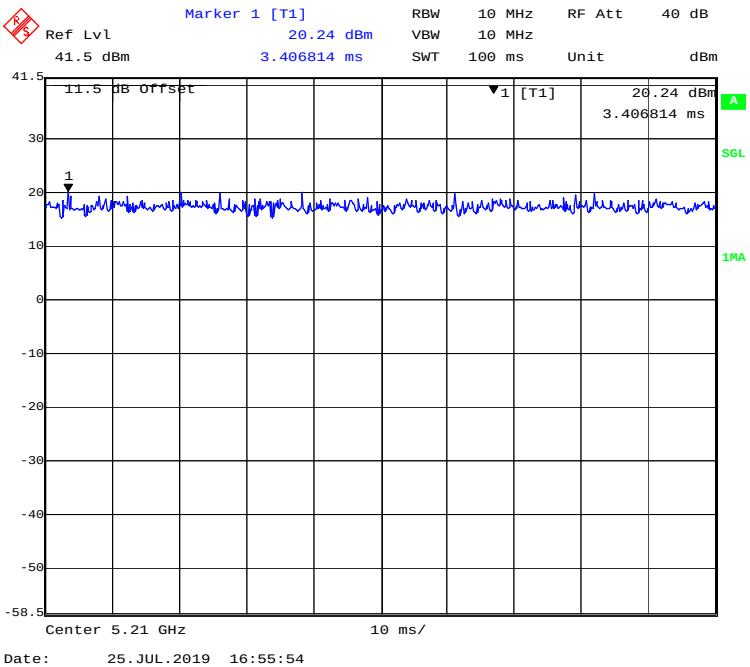
802.11 ac40 mode



802.11n-HT40 mode

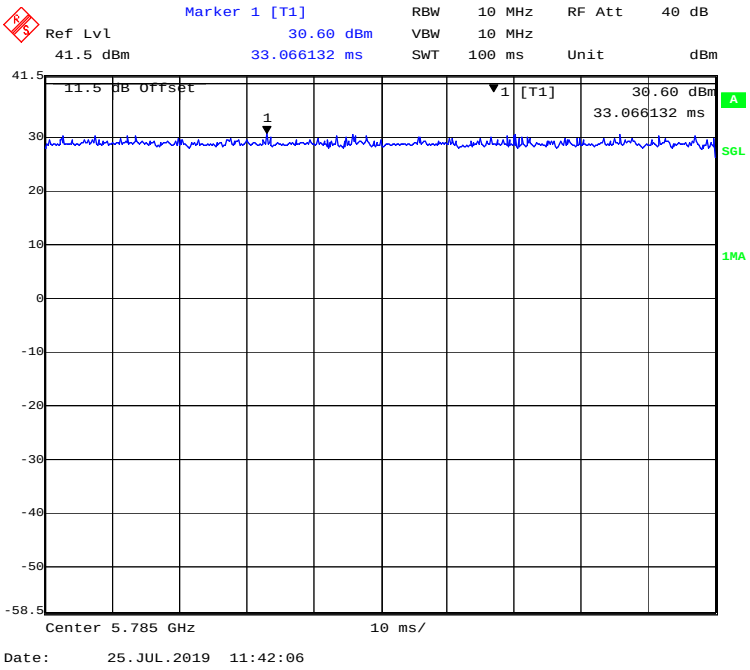


802.11 ac80 mode

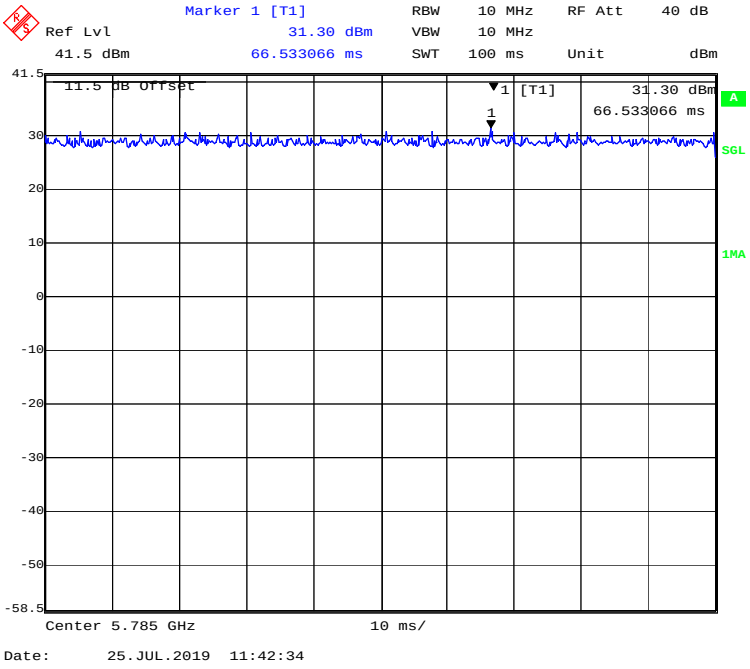


5725MHz-5850MHz Band-Chain0:

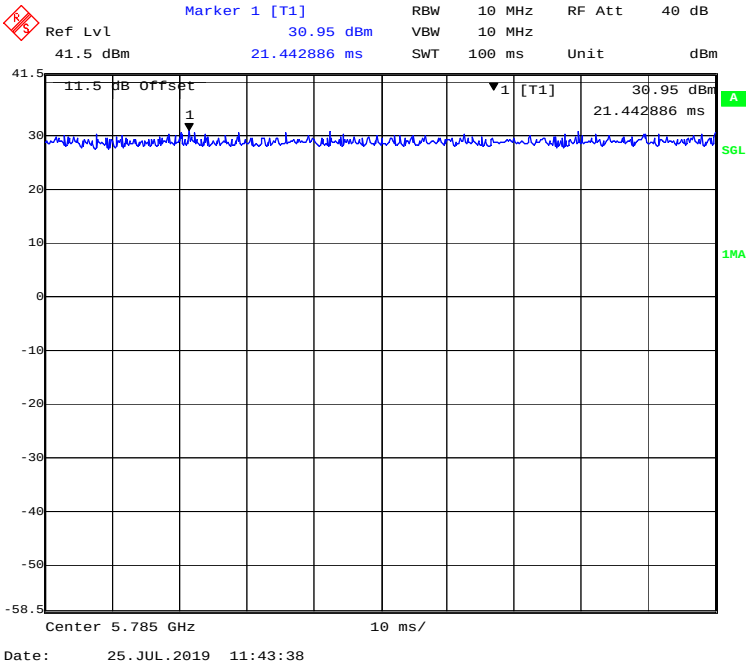
802.11a mode



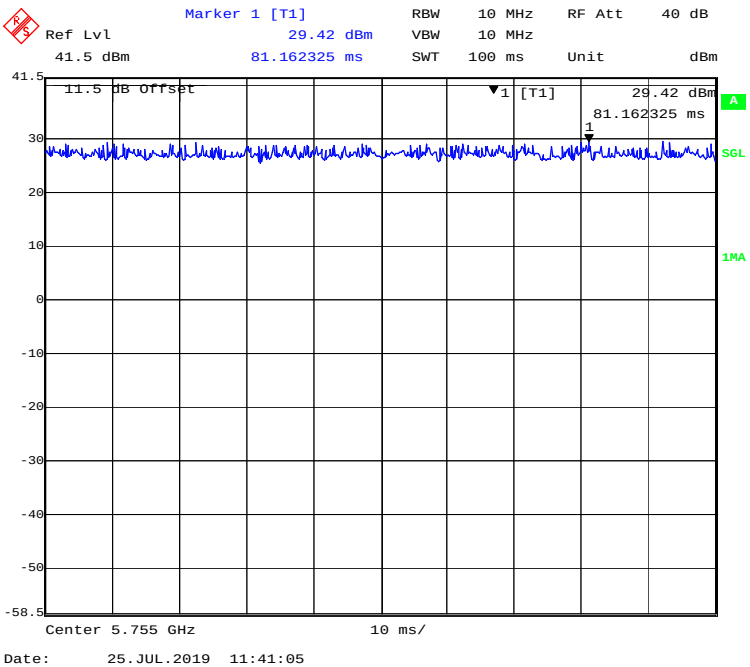
802.11ac20 mode



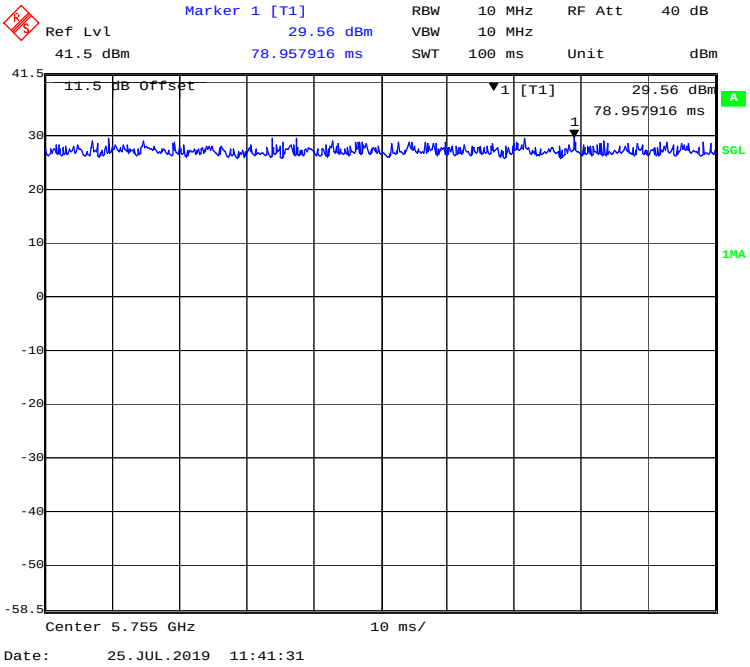
802.11n-HT20 mode



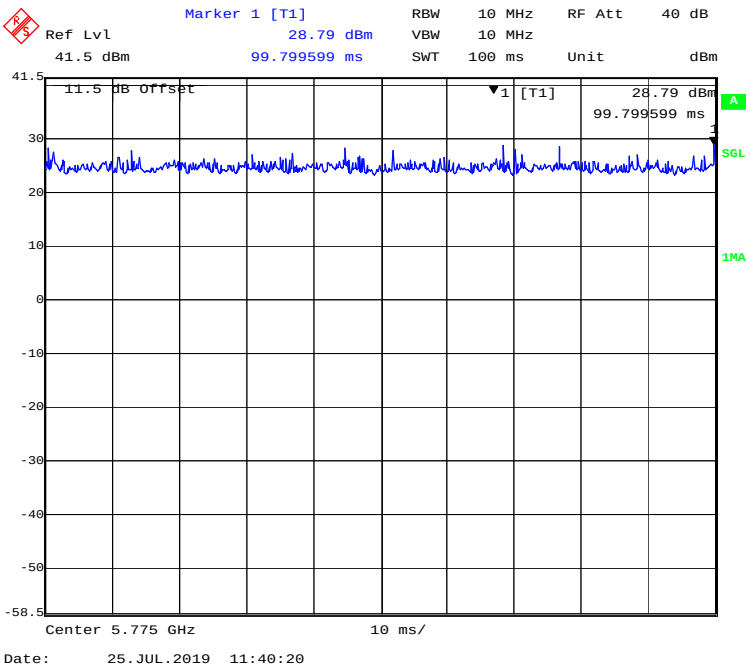
802.11 ac40 mode



802.11n-HT40 mode

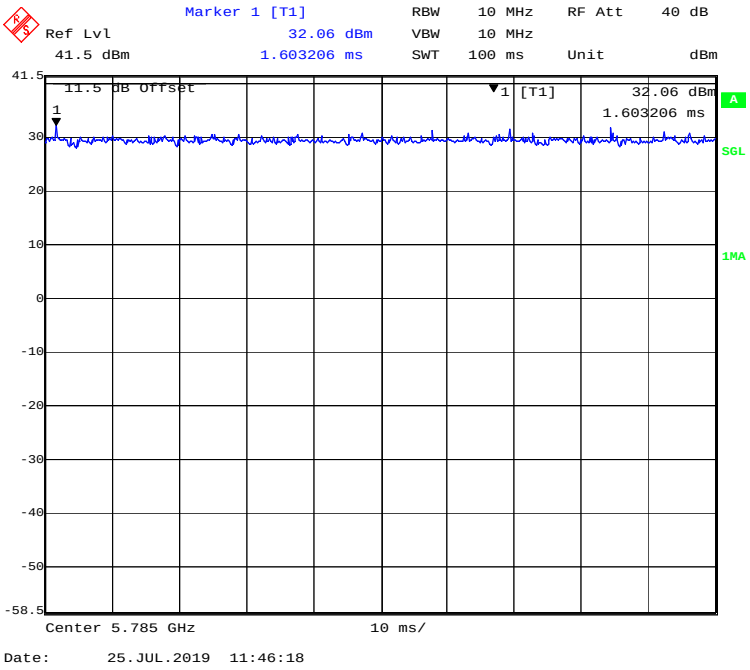


802.11n- ac80 mode

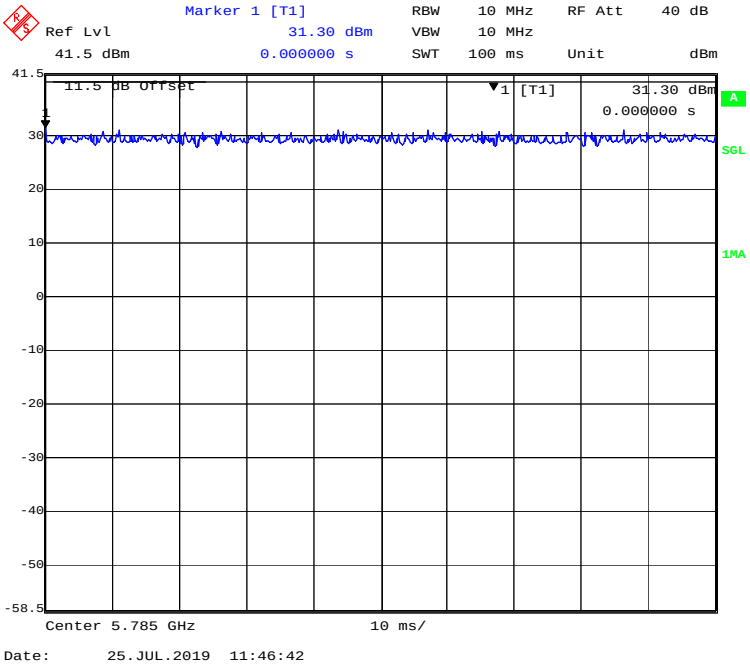


5725MHz-5850MHz Band-Chain1:

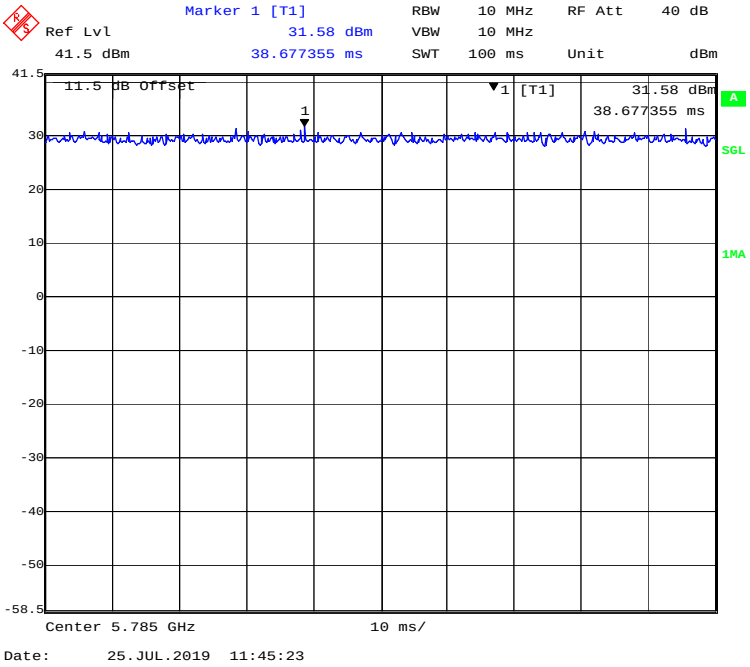
802.11a mode



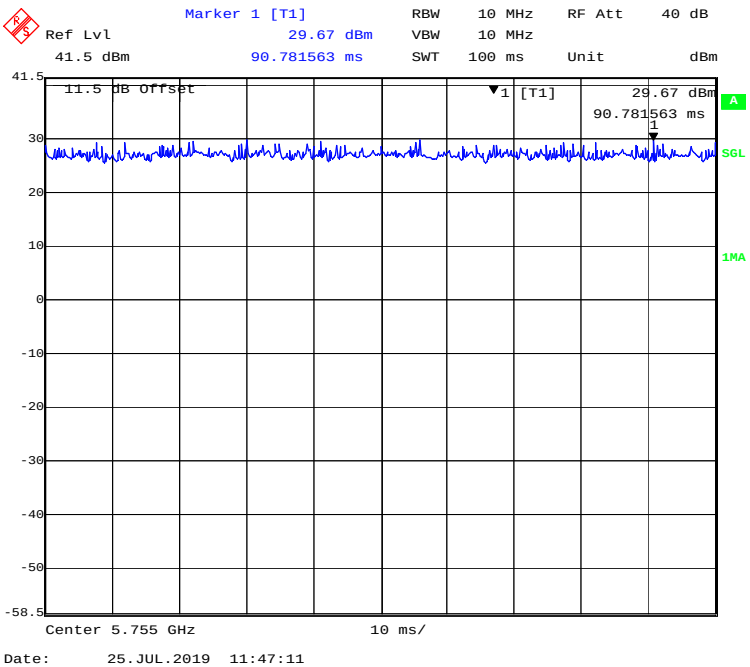
802.11ac20 mode



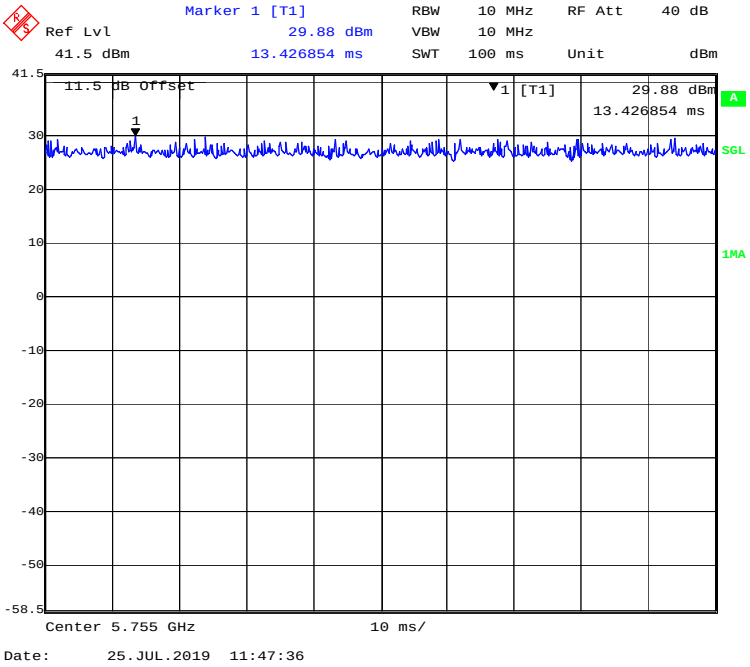
802.11n-HT20 mode



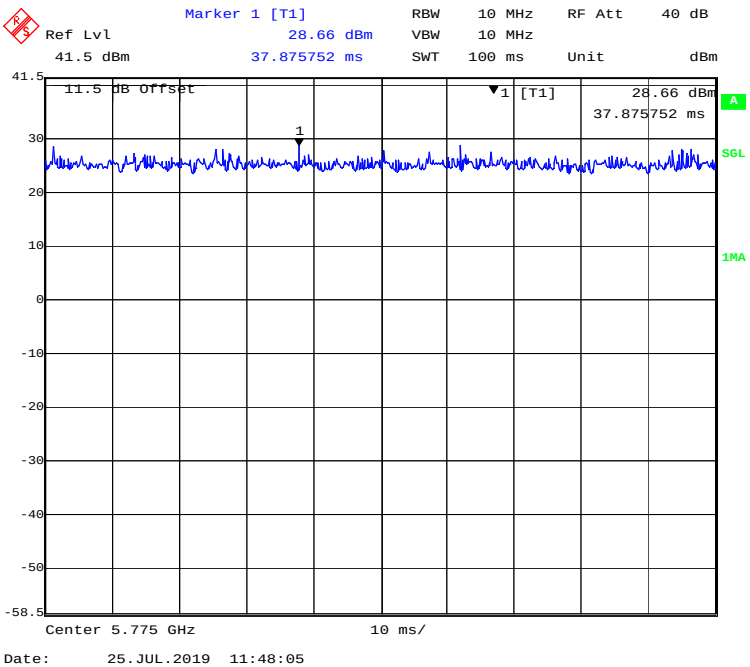
802.11 ac40 mode



802.11n-HT40 mode



802.11n- ac80 mode



Mode	Frequency Range (MHz)	Duty Cycle (%)	T (ms)	1/T (kHz)	10log(1/x)
802.11a	5150-5250	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0
802.11a	5725-5850	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0

Note: "x" means duty cycle.

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

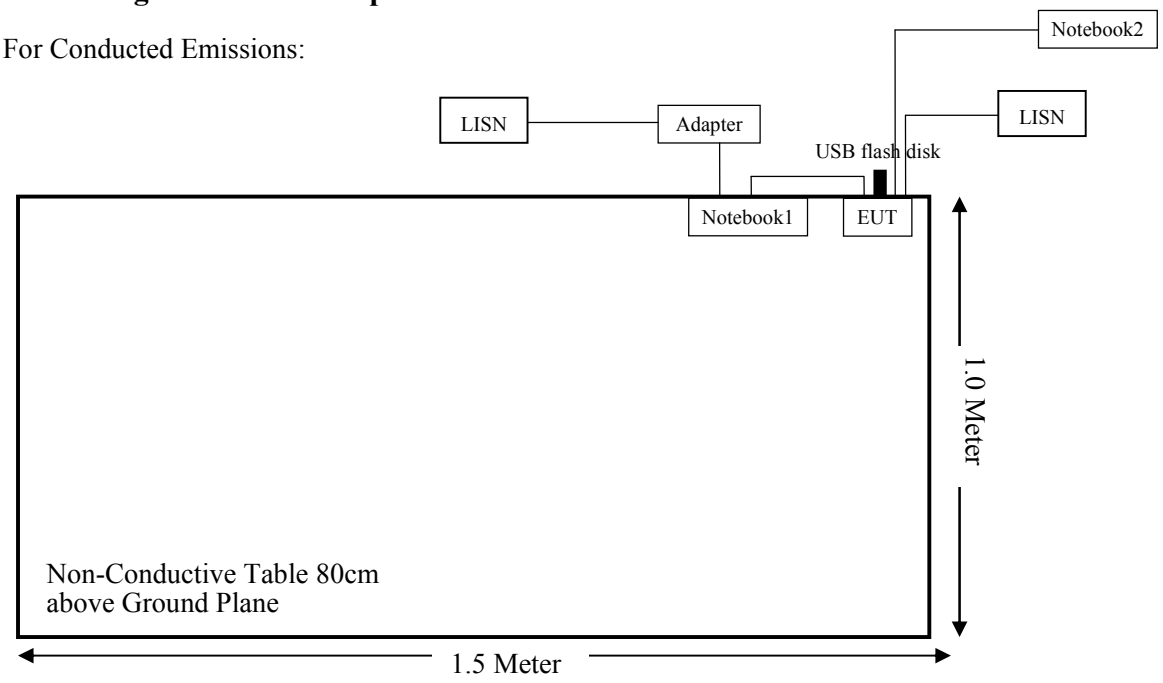
Manufacturer	Description	Model	Serial Number
DELL	Notebook1	GX620	D65874152
DELL	Notebook2	GX620	D65874152
DELL	Adapter	LA65NS0-00	DF263
Sandisk	USB flash disk	16G	/

External I/O Cable

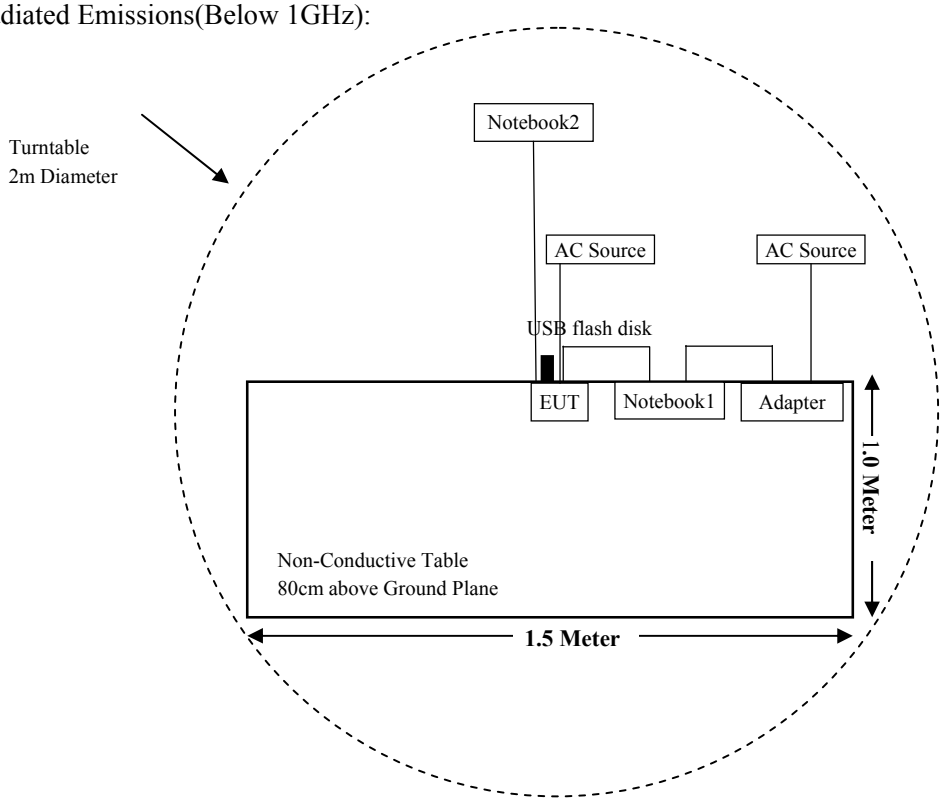
Cable Description	Length (m)	From Port	To
RJ45 Cable	1.0	EUT	Notebook1
RJ45 Cable	10.0	EUT	Notebook2
Power Cable	1.0	Notebook	Adapter
Power Cable	1.0	Adapter	AC Source
Power Cable	1.0	EUT	AC Source

Block Diagram of Test Setup

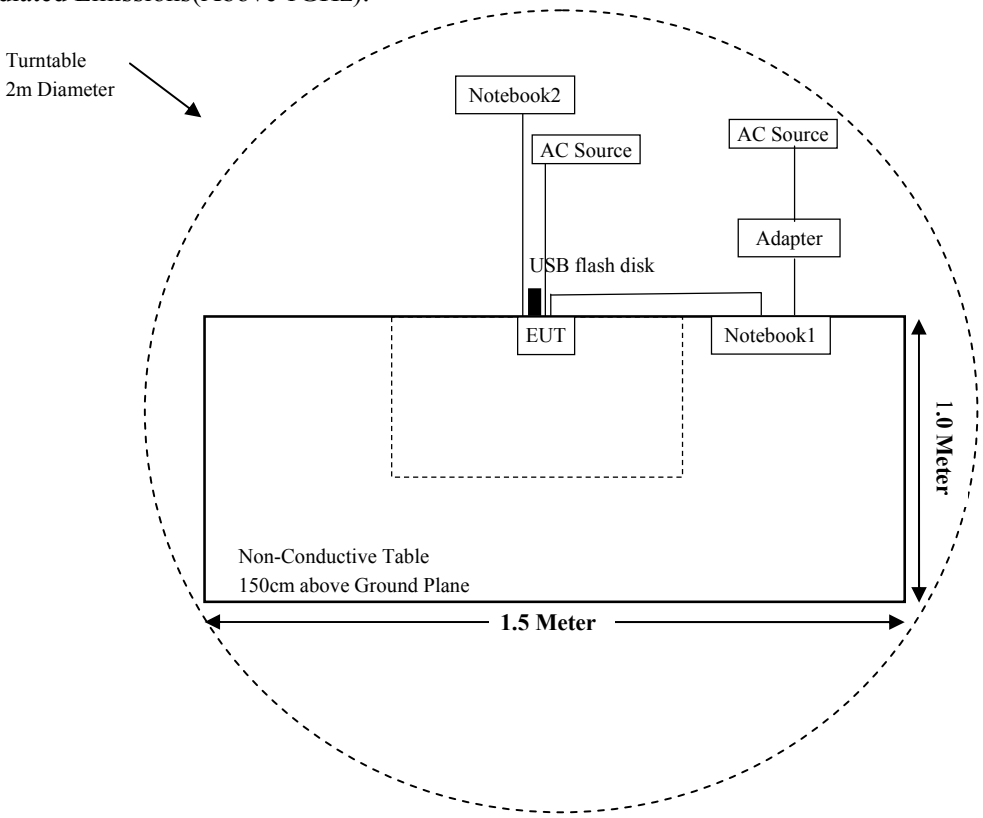
For Conducted Emissions:



For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310& §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
FCC §15.207 & §15.407(b) (6)	AC Power Line Conducted Emissions	Compliant
§15.205 & §15.209 & §15.407(b) (1) ,(6) ,(7)	Undesirable Emission & Restricted Bands	Compliant
§15.407(a)(1) (5) & §15.407 (e)	Emission Bandwidth	Compliant
§15.407 (a)(1) (3)	Conducted Transmitter Output Power	Compliant
§15.407 (a)(1) (3)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-30	2019-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sonoma Instrunent	Pre-amplifier	310N	171205	2018-08-14	2019-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2018-08-15	2019-08-14
Radiated Emission Test（Chamber 2#）					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2018-08-27	2019-08-26
ETS-LINDGREN	Horn Antenna	3115	6229	2016-12-12	2019-12-11
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-12-12	2019-12-11
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
SELECTOR	Amplifier	EM18G40G	060726	2019-03-22	2020-03-21
MICRO-TRONICS	Band Reject Filter	BRC50703	G094	2018-08-05	2019-08-04
MICRO-TRONICS	Band Reject Filter	BRC50705	G085	2018-08-05	2019-08-04
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2018-08-15	2019-08-14
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2018-11-30	2019-11-29
Agilent	Power Meter	N1912A	MY5000492	2018-11-18	2019-11-17
Agilent	Power Sensor	N1921A	MY54210024	2018-11-18	2019-11-17
Narda	Attenuator	10dB	010	2018-08-15	2019-08-14
BACL	Temperature & Humidity Chamber	BTH-150	30023	2018-12-20	2019-12-19
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	2018-10-10	2019-10-09
Sunmi	RF Cable	Sunmi C01	C01	Each Time	N/A

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
ROHDE&SCHWARZ	EMI Test receiver	ESR	1316.3003K03-102454-Qd	2019-03-13	2020-03-12
Rohde & Schwarz	LISN	ENV216	3560655016	2018-11-30	2019-11-29
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2018-11-30	2019-11-29
Audix	Test Software	e3	V9	---	---
Narda	Attenuator/6dB	10690812-2	26850-6	2019-01-10	2020-01-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2018-08-15	2019-08-14

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

§1.1310& §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/		f/1500	30
1500-100,000	/		1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	MPE Ratio
		(dBi)	(numeric)	(dBm)	(mW)				
802.11b	2412~2462	3.67	2.33	24	251.19	20	0.1164	1.0	0.1164
802.11g		3.67	2.33	24	251.19	20	0.1164	1.0	0.1164
802.11n-HT20		3.67	2.33	29	794.33	20	0.3682	1.0	0.3682
802.11n-HT40	2422~2452	3.67	2.33	28	630.96	20	0.2924	1.0	0.2924
802.11a	5180~5240	5.13	3.26	25	316.23	20	0.2051	1.0	0.2051
	5745~5825	5.13	3.26	25	316.23	20	0.2051	1.0	0.2051
802.11ac20	5180~5240	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
	5745~5825	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
802.11n20	5180~5240	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
	5745~5825	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
802.11ac40	5190~5230	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
	5755~5795	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
802.11n40	5190~5230	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
	5755~5795	5.13	3.26	28	630.96	20	0.4092	1.0	0.4092
802.11ac80	5210	5.13	3.26	21	125.89	20	0.0816	1.0	0.0816
	5775	5.13	3.26	24	251.19	20	0.1629	1.0	0.1629

Note:
(1) The Tune-up output power was declared by the Manufacturer.
(2) 2.4GWi-Fi and 5G Wi-Fi can transmit simultaneously, The worst condition is 802.11n-HT20 Wi-Fi & 5G Wi-Fi, as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.3682/1.00+0.4092/1.00=0.3682+0.4092=0.7774 < 1.0$$

Conclusion: The device meets MPE at distance 20cm.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407, if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has two PCB antennas for 5G Wi-Fi which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

ANT	Antenna Type	Max. Antenna Gain
0	PCB	4.58 dBi
1	PCB	5.13 dBi

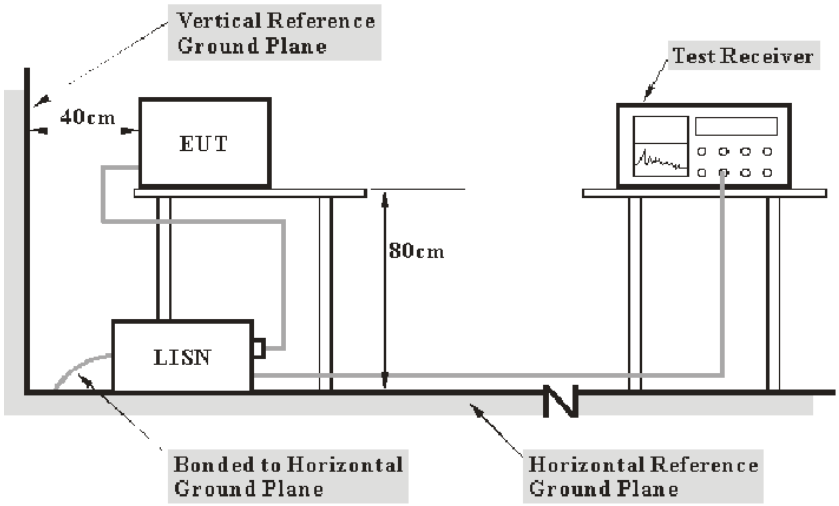
Result: Compliant.

FCC §15.407 (b) (6) §15.207 (a) – AC POWER LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a), §15.407(b) (6)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Over Limit Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Corrected Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

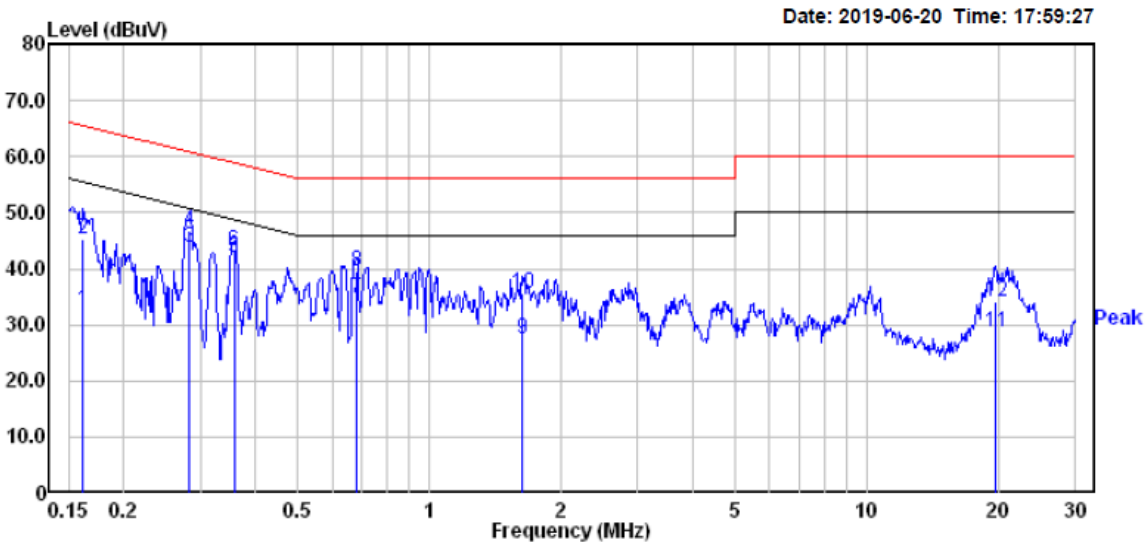
Environmental Conditions

Temperature:	20.2 ℃
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

The testing was performed by Max Min on 2019-06-20.

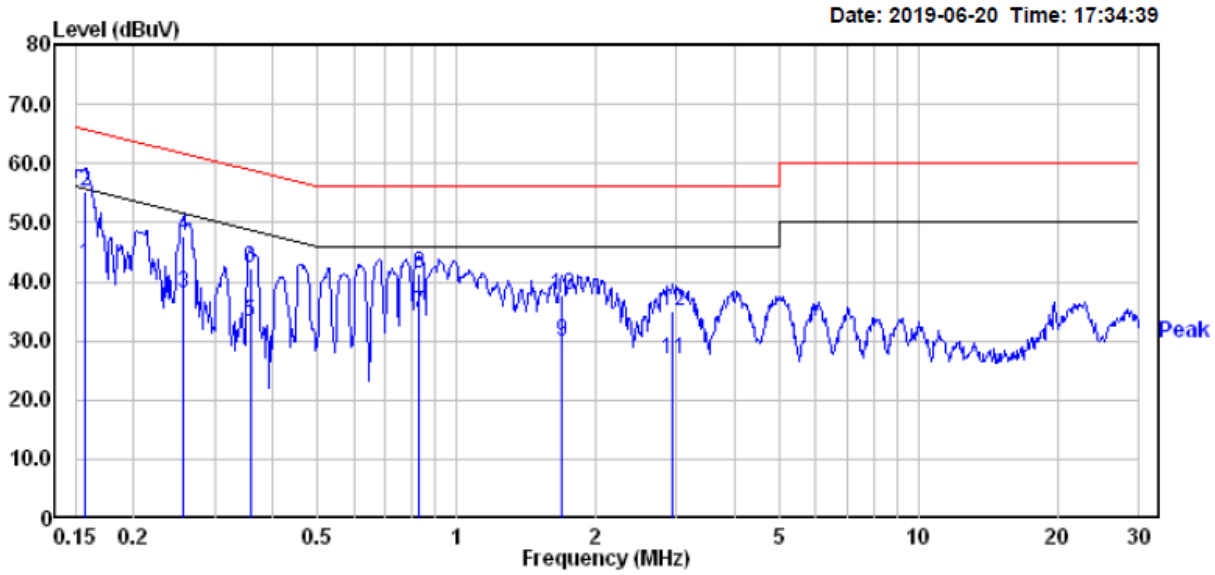
EUT operation mode: Transmitting in 802.11n-HT20 mode middle channel of 5150~5250MHz (worst case)

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.162	16.60	16.10	32.70	55.38	-22.68	Average
2	0.162	29.30	16.10	45.40	65.38	-19.98	QP
3	0.283	27.70	16.09	43.79	50.72	-6.93	Average
4	0.283	30.60	16.09	46.69	60.72	-14.03	QP
5	0.358	25.80	16.06	41.86	48.78	-6.92	Average
6	0.358	27.10	16.06	43.16	58.78	-15.62	QP
7	0.683	18.60	16.00	34.60	46.00	-11.40	Average
8	0.683	23.50	16.00	39.50	56.00	-16.50	QP
9	1.628	11.40	16.08	27.48	46.00	-18.52	Average
10	1.628	19.50	16.08	35.58	56.00	-20.42	QP
11	19.740	12.60	16.12	28.72	50.00	-21.28	Average
12	19.740	18.10	16.12	34.22	60.00	-25.78	QP

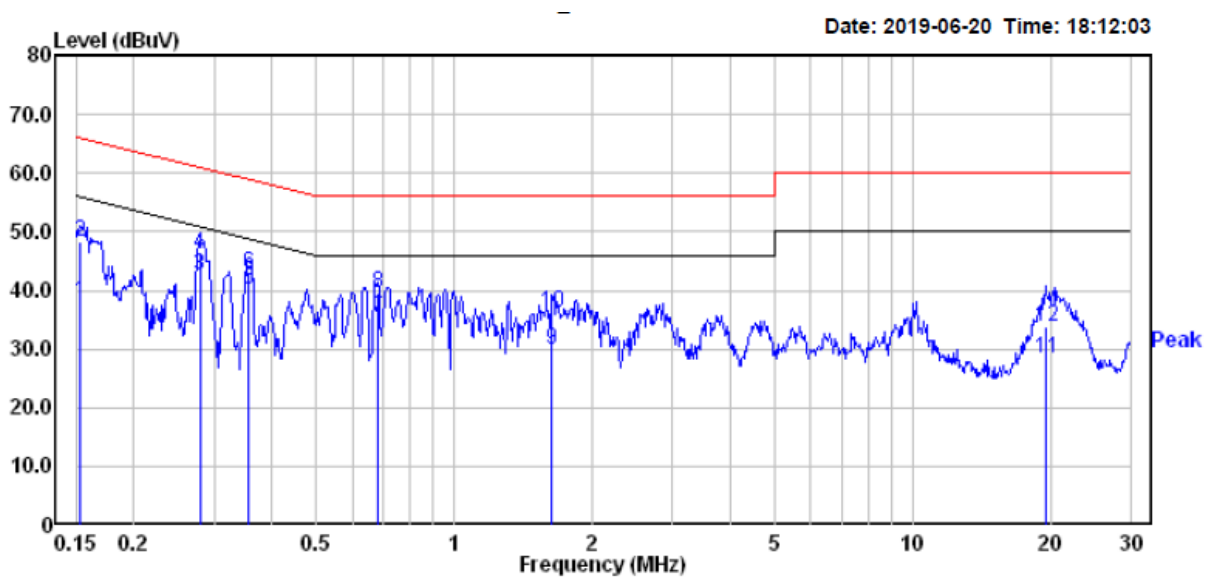
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.157	26.90	16.09	42.99	55.60	-12.61	Average
2	0.157	39.20	16.09	55.29	65.60	-10.31	QP
3	0.256	21.90	16.09	37.99	51.56	-13.57	Average
4	0.256	31.50	16.09	47.59	61.56	-13.97	QP
5	0.358	17.00	16.06	33.06	48.78	-15.72	Average
6	0.358	26.20	16.06	42.26	58.78	-16.52	QP
7	0.830	18.90	15.96	34.86	46.00	-11.14	Average
8	0.830	25.30	15.96	41.26	56.00	-14.74	QP
9	1.689	13.80	16.08	29.88	46.00	-16.12	Average
10	1.689	21.80	16.08	37.88	56.00	-18.12	QP
11	2.931	11.30	15.70	27.00	46.00	-19.00	Average
12	2.931	19.20	15.70	34.90	56.00	-21.10	QP

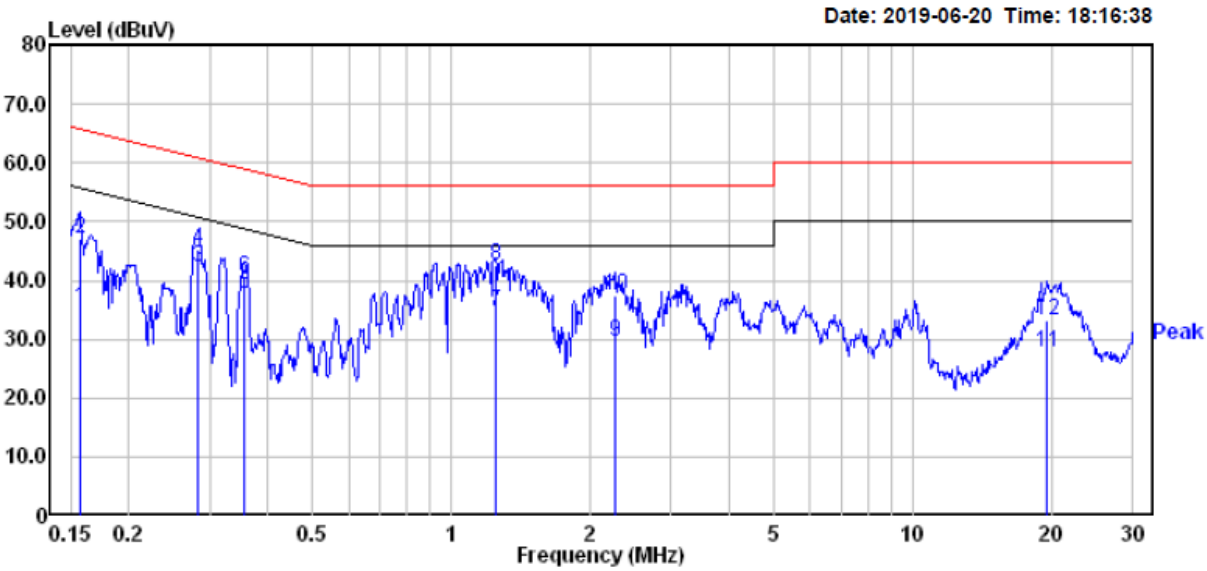
EUT operation mode: Transmitting in 802.11n-HT20 mode middle channel of 5725-5850MHz (worst case)

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.153	21.90	16.09	37.99	55.82	-17.83	Average
2	0.153	32.10	16.09	48.19	65.82	-17.63	QP
3	0.279	26.60	16.09	42.69	50.85	-8.16	Average
4	0.279	30.10	16.09	46.19	60.85	-14.66	QP
5	0.356	24.00	16.06	40.06	48.83	-8.77	Average
6	0.356	26.80	16.06	42.86	58.83	-15.97	QP
7	0.683	19.40	16.00	35.40	46.00	-10.60	Average
8	0.683	23.60	16.00	39.60	56.00	-16.40	QP
9	1.636	13.90	16.08	29.98	46.00	-16.02	Average
10	1.636	20.00	16.08	36.08	56.00	-19.92	QP
11	19.532	12.40	16.11	28.51	50.00	-21.49	Average
12	19.532	17.80	16.11	33.91	60.00	-26.09	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	19.10	16.09	35.19	55.65	-20.46	Average
2	0.156	30.90	16.09	46.99	65.65	-18.66	QP
3	0.283	26.20	16.09	42.29	50.72	-8.43	Average
4	0.283	29.30	16.09	45.39	60.72	-15.33	QP
5	0.356	21.70	16.06	37.76	48.83	-11.07	Average
6	0.356	24.50	16.06	40.56	58.83	-18.27	QP
7	1.249	18.59	16.07	34.66	46.00	-11.34	Average
8	1.249	26.39	16.07	42.46	56.00	-13.54	QP
9	2.261	13.60	15.87	29.47	46.00	-16.53	Average
10	2.261	21.70	15.87	37.57	56.00	-18.43	QP
11	19.532	11.70	16.11	27.81	50.00	-22.19	Average
12	19.532	17.20	16.11	33.31	60.00	-26.69	QP

Note:

1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
2) Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

§15.205 & §15.209 & §15.407(B) (1),(6),(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1), (6), (7); §15.209; §15.205;

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27dBm/MHz

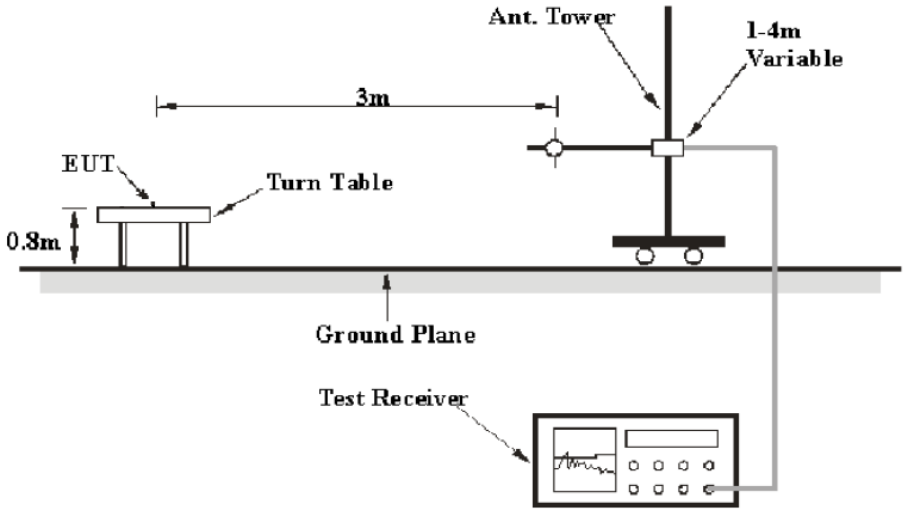
For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

As per FCC §15.35(d):Unless otherwise specified, on any frenquency or frequencies above 1000MHz,the radiated emission limits are based on the use of measurement instrunmentation employing an average detector function. Unless otherwise specified, measurements above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz.

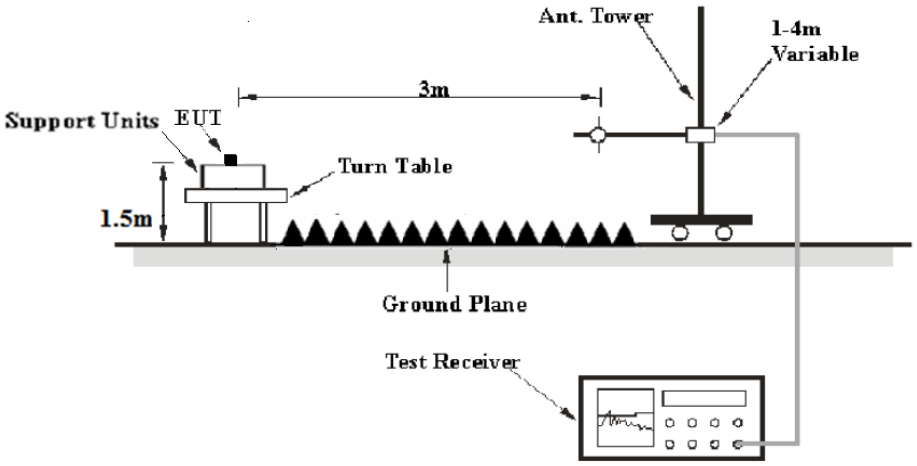
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP [dBm] + 95.2, for d = 3 meters.

EUT Setup

Below 1 GHz:



1 GHz-40GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	PK
	1MHz	3 MHz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit –Extrapolation result

Test Data

Environmental Conditions

Temperature:	24.8 ℃
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

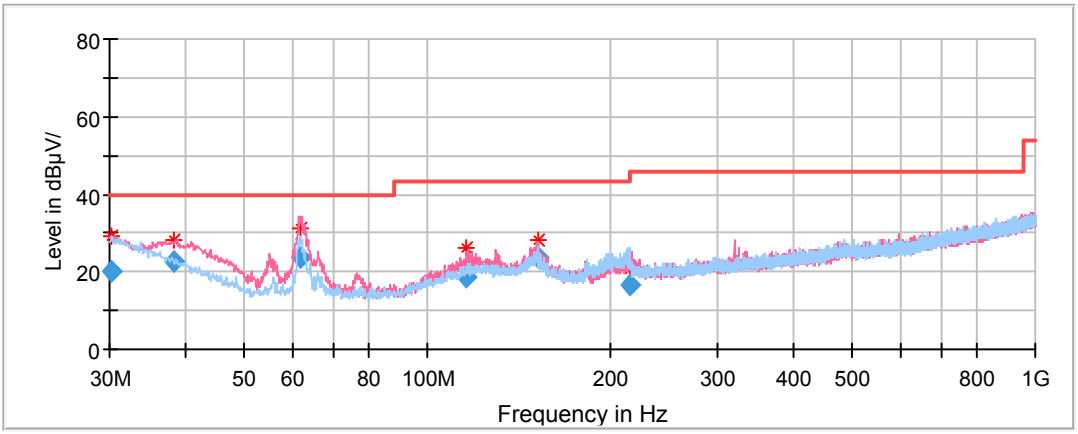
The testing was performed by Max Min on 2019-07-27.

Test Mode: Transmitting

Spurious Emission Test

30MHz-1GHz(5150-5250MHz Band):

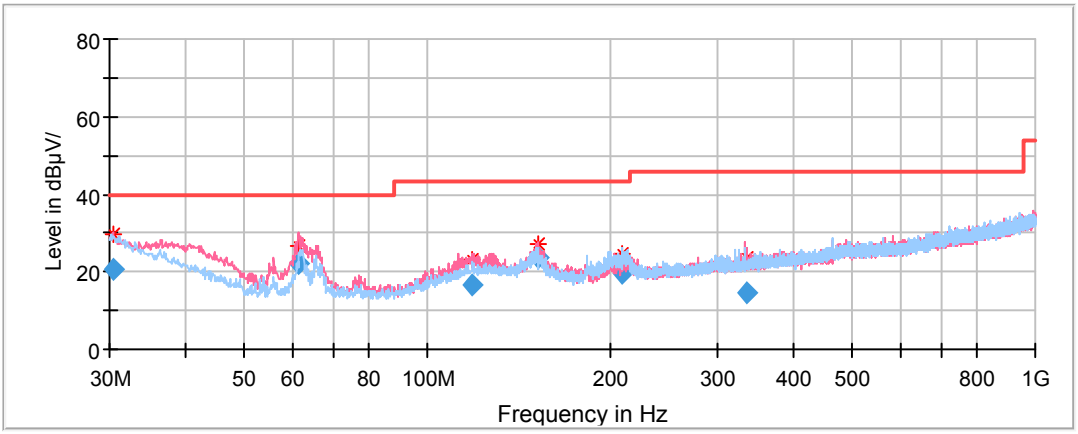
Pre-scan with 802.11a，802.11a c20，802.11n-HT20，802.11a c40，802.11n-HT40 and 802.11 a c80 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11n-HT20 MIMO mode in channel 5180 in Z-axis of orientation was recorded



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
30.181754	20.22	100	V	51.0	-4.1	40.00	19.78
38.248100	22.57	100	V	110.0	-9.5	40.00	17.43
61.908450	23.46	100	V	200.0	-17.8	40.00	16.54
116.005100	18.43	100	V	158.0	-11.9	43.50	25.07
151.760450	23.55	100	V	141.0	-12.4	43.50	19.95
215.310250	16.57	100	H	25.0	-12.3	43.50	26.93

30MHz-1GHz(5725-5850MHz Band):

Pre-scan with 802.11a and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11n-HT20 MIMO mode in channel 5745 in Z-axis of orientation was recorded



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
30.498250	20.75	100.0	V	234.0	-4.3	40.00	19.25
61.614900	22.38	100.0	V	197.0	-17.8	40.00	17.62
118.298650	16.61	100.0	V	336.0	-11.5	43.50	26.89
151.673200	23.40	100.0	V	136.0	-12.4	43.50	20.10
208.758200	19.39	100.0	H	19.0	-12.3	43.50	24.11
334.437250	14.48	100.0	V	319.0	-9.7	46.00	31.52

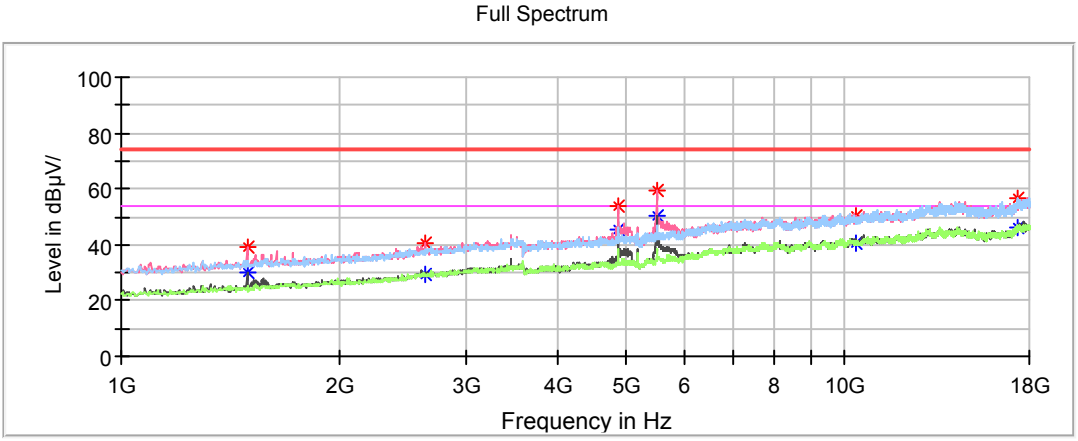
1GHz-18GHz (5150-5250MHz Band):

802.11a Mode(chain0):

*(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

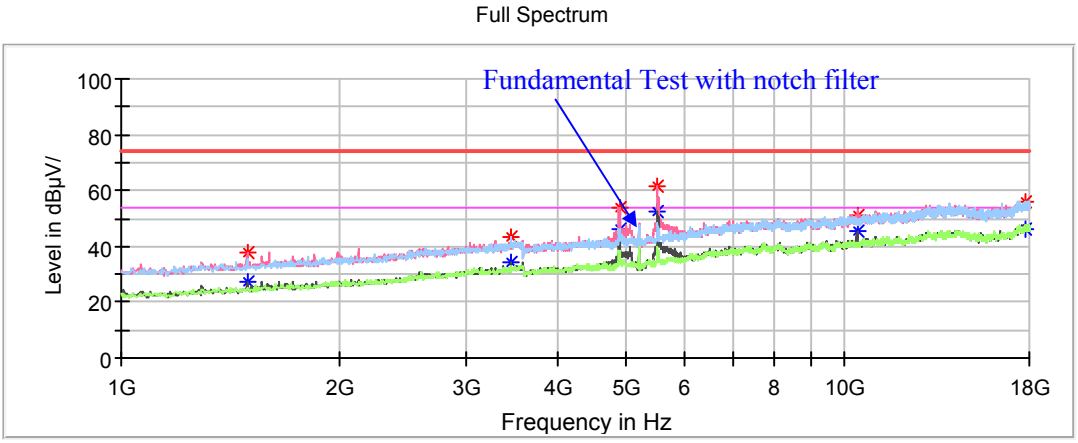
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz



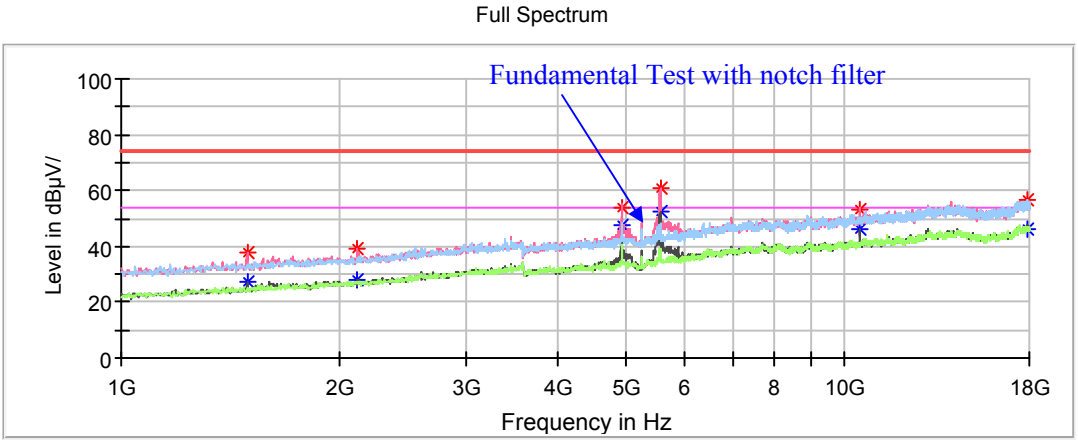
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	29.76	200.0	V	59.0	-10.0	54.00	24.24
1493.000000	39.29	---	200.0	V	59.0	-10.0	74.00	34.71
2628.600000	40.33	---	200.0	V	94.0	-6.3	68.20	27.87
4862.400000	---	45.11	200.0	V	258.0	-0.5	54.00	8.89
4862.400000	54.17	---	200.0	V	258.0	-0.5	68.20	14.03
5498.200000	59.27	---	200.0	V	306.0	1.4	68.20	8.93
10350.000000	50.42	---	200.0	V	47.0	8.8	68.20	17.78

Middle Channel: 5200MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	27.35	150.0	V	77.0	-10.0	54.00	26.65
1493.000000	37.48	---	150.0	V	77.0	-10.0	74.00	36.52
3454.800000	43.05	---	200.0	V	140.0	-3.6	68.2	25.15
4879.400000	---	46.38	200.0	V	246.0	-0.4	54.00	7.62
4879.400000	53.58	---	200.0	V	246.0	-0.4	74.00	20.42
5518.600000	61.23	---	200.0	V	307.0	1.4	68.2	6.97
10397.600000	51.33	---	150.0	V	53.0	8.8	68.2	16.87
17765.400000	---	46.13	150.0	V	358.0	13.9	54.00	7.87
17765.400000	56.25	---	150.0	V	358.0	13.9	74.00	17.75

High Channel: 5240MHz



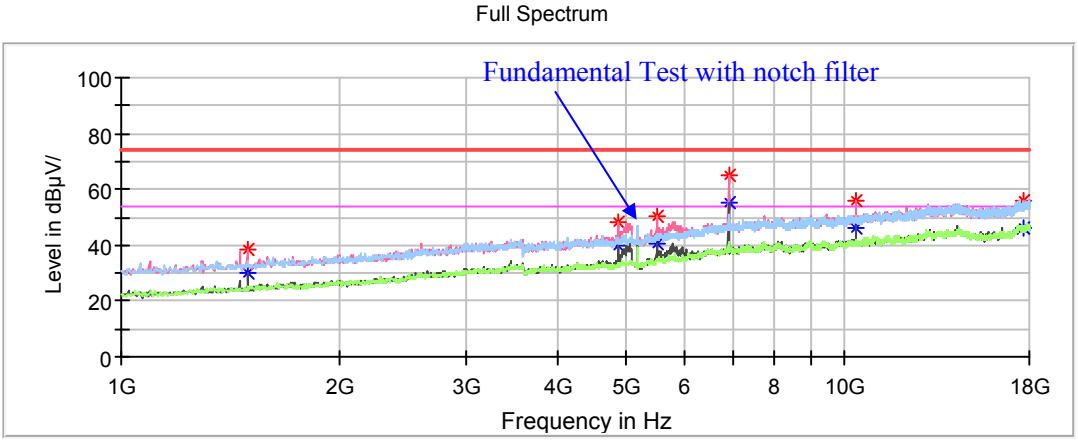
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	27.38	150.0	V	66.0	-10.0	54.00	26.62
1493.000000	37.56	---	150.0	V	66.0	-10.0	74.00	36.44
2122.000000	39.10	---	200.0	V	81.0	-7.9	68.20	29.1
4920.200000	---	47.67	200.0	V	234.0	-0.4	54.00	6.33
4920.200000	54.07	---	200.0	V	234.0	-0.4	74.00	19.93
5559.400000	60.82	---	200.0	V	9.0	1.5	68.20	7.38
10482.600000	53.01	---	150.0	V	54.0	9.0	68.20	15.19
17891.200000	---	46.17	200.0	H	143.0	13.7	54.00	7.83
17891.200000	56.53	---	200.0	H	143.0	13.7	74.00	17.47

802.11a Mode(chain1):

*(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

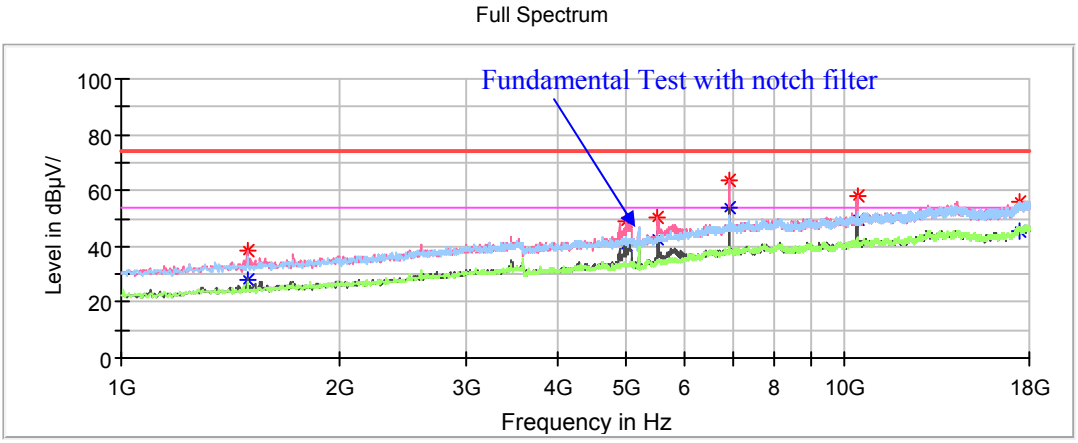
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz



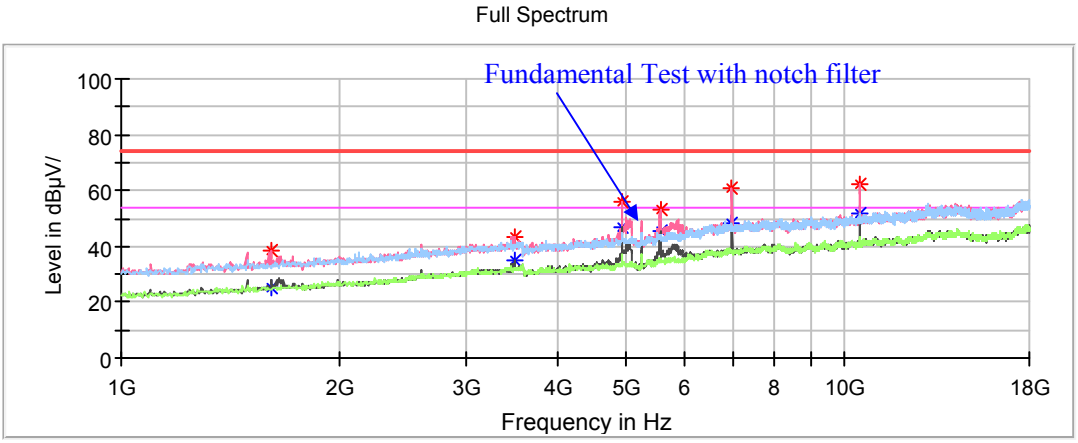
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1496.400000	---	29.89	200.0	V	58.0	-9.9	54.00	24.11
1496.400000	38.71	---	200.0	V	58.0	-9.9	74.00	35.29
4859.000000	---	39.55	150.0	V	78.0	-0.5	54.00	14.45
4859.000000	48.55	---	150.0	V	78.0	-0.5	74.00	25.45
5498.200000	50.07	---	200.0	V	23.0	1.4	68.20	18.13
6905.800000	64.91	---	150.0	V	66.0	5.2	68.20	3.29
10363.600000	55.65	---	150.0	V	42.0	8.8	68.20	12.55
17643.000000	56.07	---	150.0	V	229.0	14.1	68.20	12.13

Middle Channel: 5200MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	27.80	200.0	V	59.0	-10.0	54.00	26.20
1493.000000	38.27	---	200.0	V	59.0	-10.0	74.00	35.73
4998.400000	---	40.26	150.0	V	84.0	-0.3	54.00	13.74
4998.400000	49.09	---	150.0	V	84.0	-0.3	74.00	24.91
5518.600000	50.64	---	150.0	V	25.0	1.4	68.20	17.56
6933.000000	63.29	---	150.0	V	72.0	5.2	68.20	4.91
10401.000000	57.72	---	200.0	V	70.0	8.8	68.20	10.48
17493.400000	55.68	---	150.0	V	143.0	14.2	68.20	12.52

High Channel: 5240MHz



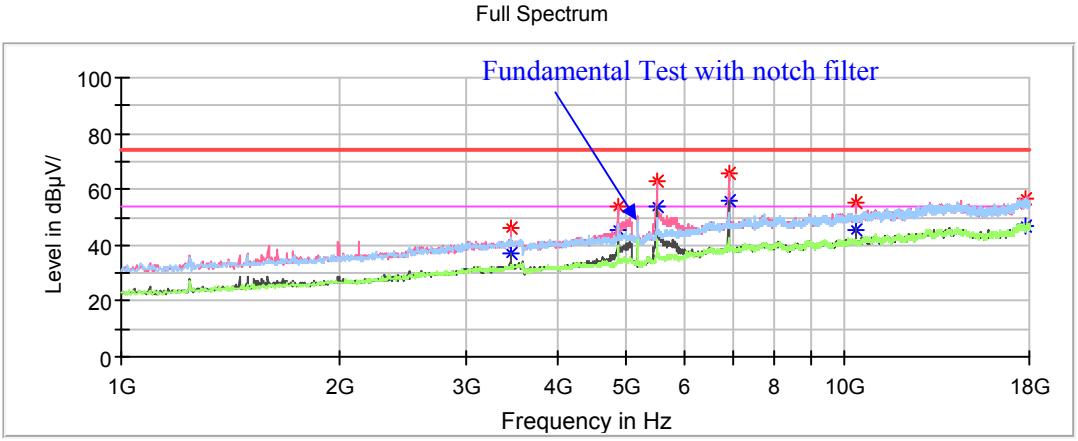
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1608.600000	---	25.17	200.0	V	102.0	-9.6	54.00	28.83
1608.600000	38.48	---	200.0	V	102.0	-9.6	74.00	35.52
3495.600000	43.39	---	150.0	V	114.0	-3.5	68.20	24.81
4920.200000	---	46.71	150.0	V	78.0	-0.4	54.00	7.29
4920.200000	56.24	---	150.0	V	78.0	-0.4	74.00	17.76
5559.400000	53.32	---	200.0	V	137.0	1.5	68.20	14.88
6987.400000	61.04	---	150.0	V	66.0	5.3	68.20	7.16
10475.800000	62.12	---	200.0	V	55.0	8.9	68.20	6.08

802.11ac20 Mode(chain0+chain1):

*(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

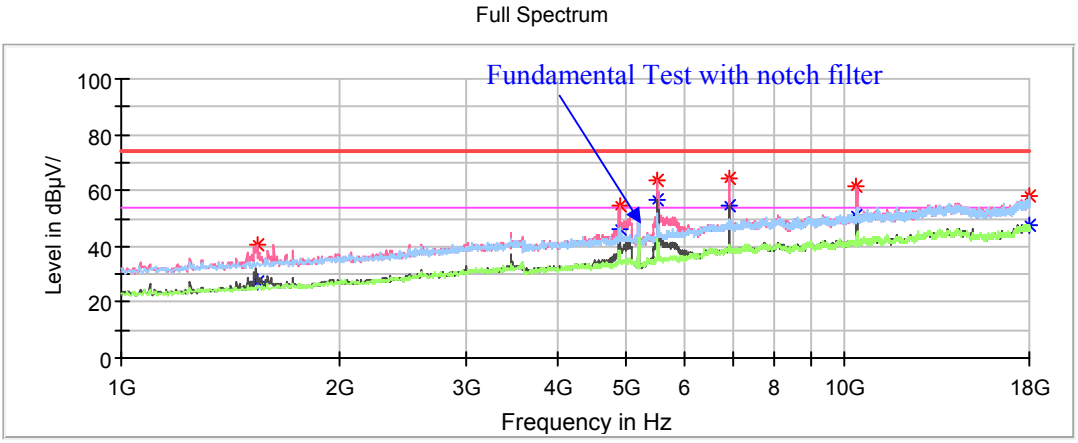
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz



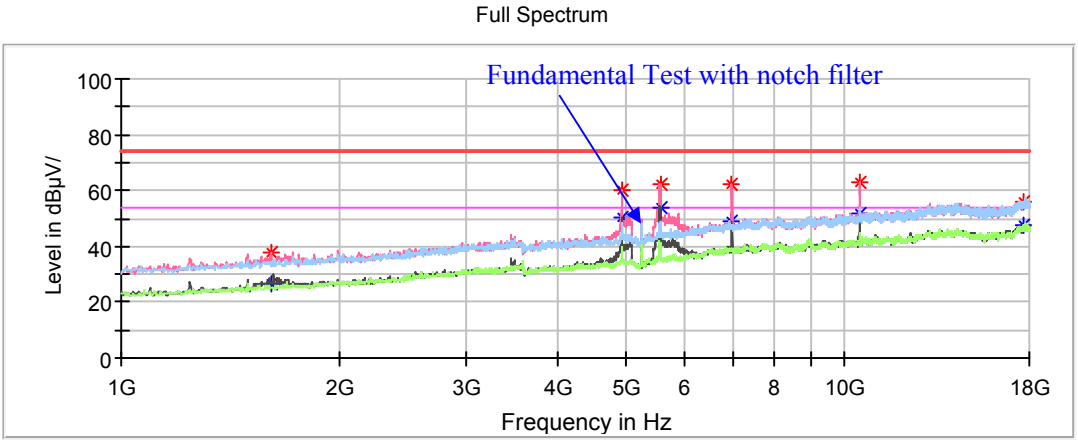
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
3454.800000	46.00	---	200.0	V	82.0	-3.6	68.20	22.20
4865.800000	---	45.60	250.0	V	261.0	-0.5	54.00	8.40
4865.800000	53.52	---	250.0	V	261.0	-0.5	74.00	20.48
5498.200000	62.86	---	150.0	V	31.0	1.4	68.20	5.34
6905.800000	65.64	---	150.0	V	66.0	5.2	68.20	2.56
10353.400000	55.36	---	150.0	V	307.0	8.8	68.20	12.84
17758.600000	---	47.10	250.0	H	331.0	13.9	54.00	6.90
17758.600000	56.34	---	250.0	H	331.0	13.9	74.00	17.66

Middle Channel: 5200MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1540.600000	---	27.49	250.0	V	174.0	-9.8	54.00	26.51
1540.600000	40.62	---	250.0	V	174.0	-9.8	74.00	33.38
4882.800000	---	45.95	200.0	V	276.0	-0.4	54.00	8.05
4882.800000	54.79	---	200.0	V	276.0	-0.4	74.00	19.21
5518.600000	63.89	---	150.0	V	31.0	1.4	68.20	19.21
6933.000000	64.01	---	150.0	V	66.0	5.2	68.20	4.31
10394.200000	61.80	---	150.0	V	308.0	8.8	68.20	4.19
17949.000000	---	47.60	200.0	H	125.0	13.6	54.00	6.40
17949.000000	57.87	---	200.0	H	125.0	13.6	74.00	16.13

High Channel: 5240MHz

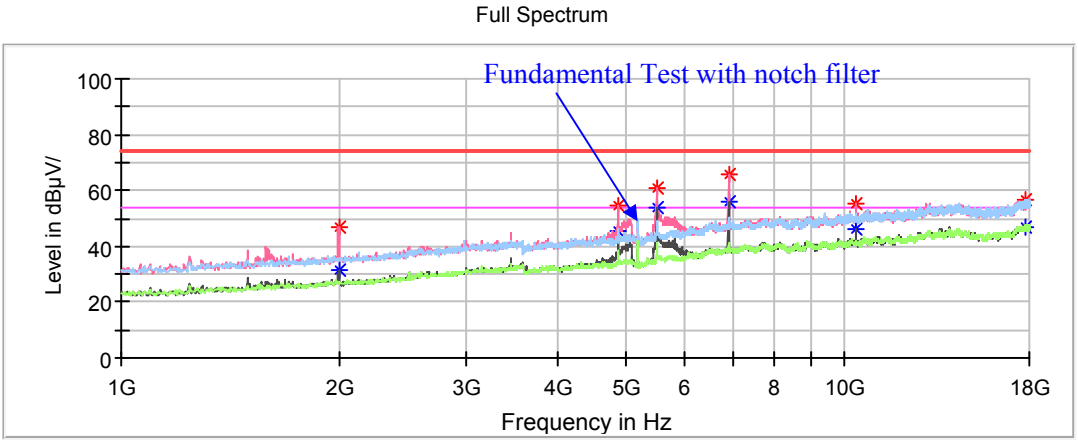


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1608.600000	37.71	---	200.0	V	165.0	-9.6	74.00	36.29
1608.600000	---	26.42	200.0	V	165.0	-9.6	54.00	27.58
4920.200000	60.24	---	200.0	V	118.0	-0.4	74.00	13.76
4920.200000	---	50.62	200.0	V	118.0	-0.4	54.00	3.38
5559.400000	62.41	---	150.0	V	352.0	1.5	68.20	5.79
6987.400000	62.21	---	150.0	V	73.0	5.3	68.20	5.99
10472.400000	62.93	---	250.0	V	22.0	8.9	68.20	5.27
17653.200000	56.08	---	200.0	H	197.0	14.0	68.20	12.12

802.11n-HT20 Mode*(chain0+chain1):*
*Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded*

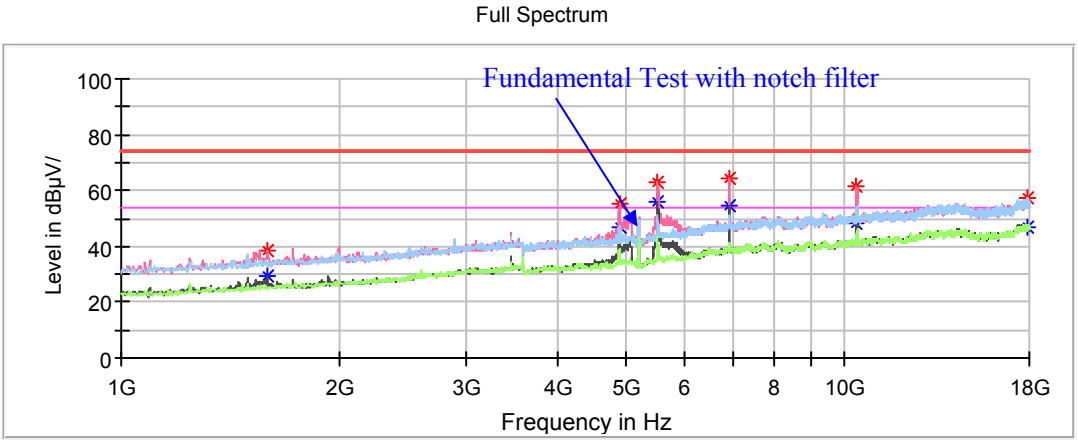
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz



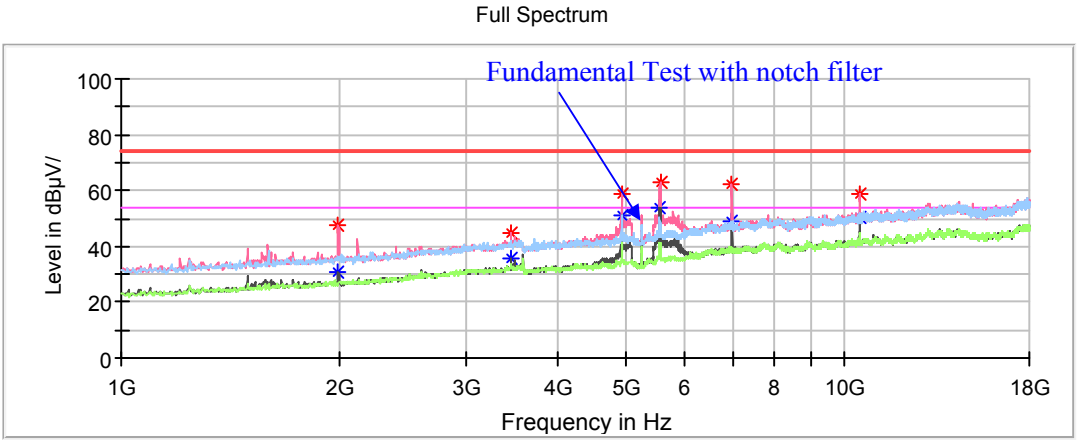
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1999.600000	46.62	---	250.0	V	96.0	-8.2	68.20	21.58
4859.000000	---	45.29	250.0	V	261.0	-0.5	54.00	8.71
4859.000000	54.58	---	250.0	V	261.0	-0.5	74.00	19.42
5498.200000	61.16	---	250.0	V	296.0	1.4	68.20	7.04
6905.800000	65.98	---	150.0	V	72.0	5.2	68.20	2.22
10367.000000	55.57	---	200.0	V	54.0	8.8	68.20	12.63
17819.800000	---	46.59	150.0	H	270.0	13.8	54.00	7.41
17819.800000	56.60	---	150.0	H	270.0	13.8	74.00	17.40

Middle Channel: 5200MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	---	29.12	250.0	V	298.0	-9.6	54.00	24.88
1591.600000	38.40	---	250.0	V	298.0	-9.6	74.00	35.60
4882.800000	---	47.16	250.0	V	263.0	-0.4	54.00	6.84
4882.800000	55.14	---	250.0	V	263.0	-0.4	74.00	18.86
5518.600000	62.99	---	150.0	V	351.0	1.4	68.20	5.21
6933.000000	63.99	---	150.0	V	66.0	5.2	68.20	4.21
10390.800000	61.26	---	250.0	V	67.0	8.8	68.20	6.94
17904.800000	---	46.92	150.0	H	300.0	13.6	54.00	7.08
17904.800000	57.41	---	150.0	H	300.0	13.6	74.00	16.59

High Channel: 5240MHz



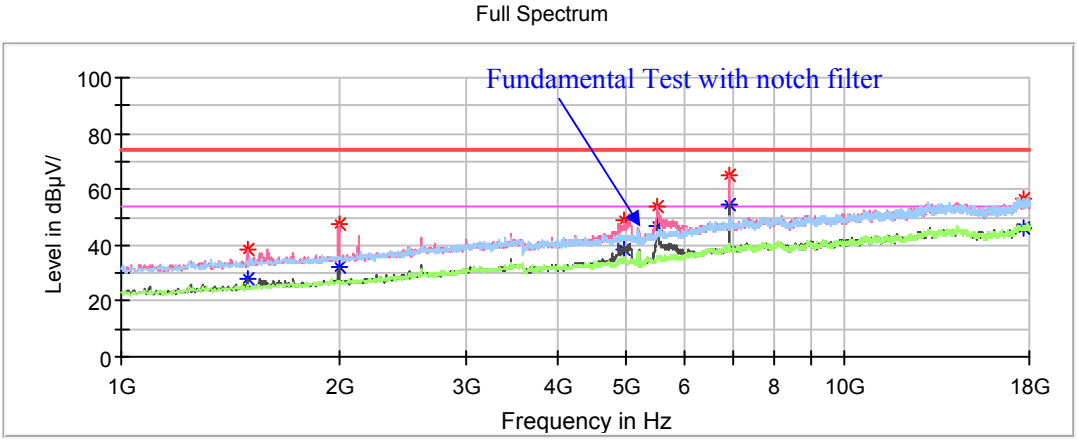
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1996.200000	47.54	---	250.0	V	17.0	-8.3	68.20	20.66
3454.800000	---	35.60	250.0	V	139.0	-3.6	68.20	32.60
4920.200000	---	50.95	250.0	V	115.0	-0.4	54.00	3.05
4920.200000	58.96	---	250.0	V	115.0	-0.4	74.00	15.04
5559.400000	63.19	---	200.0	V	121.0	1.5	68.20	5.01
6987.400000	62.15	---	150.0	V	88.0	5.3	68.20	6.05
10479.200000	58.90	---	150.0	V	52.0	8.9	68.20	9.30

802.11ac40 Mode(chain0+chain1):

*(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

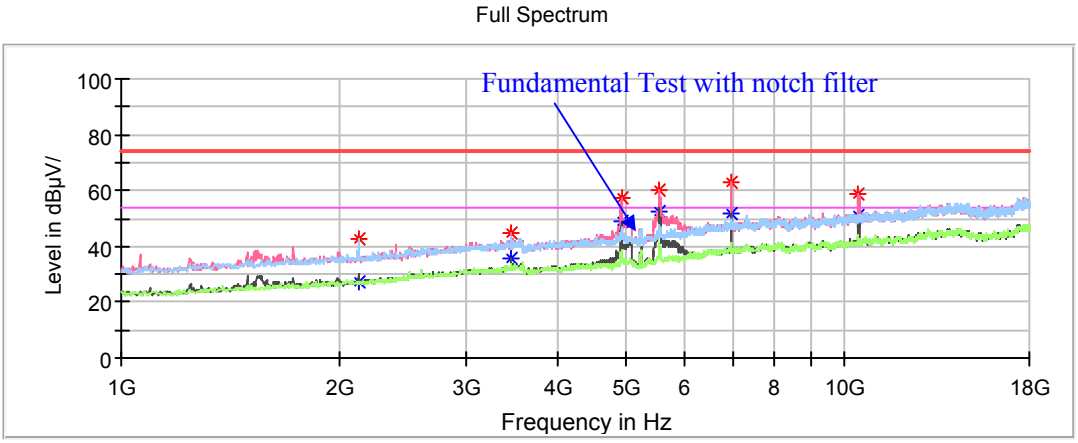
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5190MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	27.76	200.0	V	59.0	-10.0	54.00	26.24
1493.000000	38.78	---	200.0	V	59.0	-10.0	74.00	35.22
1999.600000	47.56	---	250.0	V	0.0	-8.2	68.20	20.64
4950.800000	---	38.19	200.0	V	225.0	-0.3	54.00	15.81
4950.800000	48.79	---	200.0	V	225.0	-0.3	74.00	25.21
5508.400000	54.08	---	250.0	V	282.0	1.4	68.20	14.12
6919.400000	64.91	---	150.0	V	77.0	5.2	68.20	3.29
17666.800000	56.63	---	250.0	H	0.0	14.0	68.20	11.57

High Channel: 5230MHz

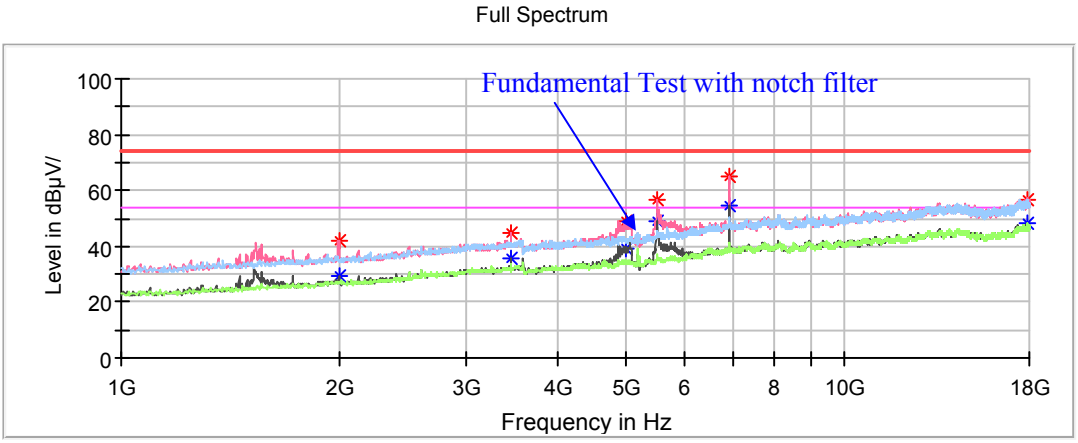


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
2132.200000	42.46	---	250.0	V	81.0	-7.9	68.20	25.74
3454.800000	44.95	---	250.0	V	140.0	-3.6	68.20	23.25
4910.000000	---	48.80	200.0	V	105.0	-0.4	54.00	5.20
4910.000000	57.28	---	200.0	V	105.0	-0.4	74.00	16.72
5539.000000	60.24	---	150.0	V	6.0	1.5	68.20	7.96
6973.800000	62.78	---	200.0	V	65.0	5.3	68.20	5.42
10455.400000	58.65	---	150.0	V	59.0	8.9	68.20	9.55

802.11n-HT40 Mode*(chain0+chain1)*:
*Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded*

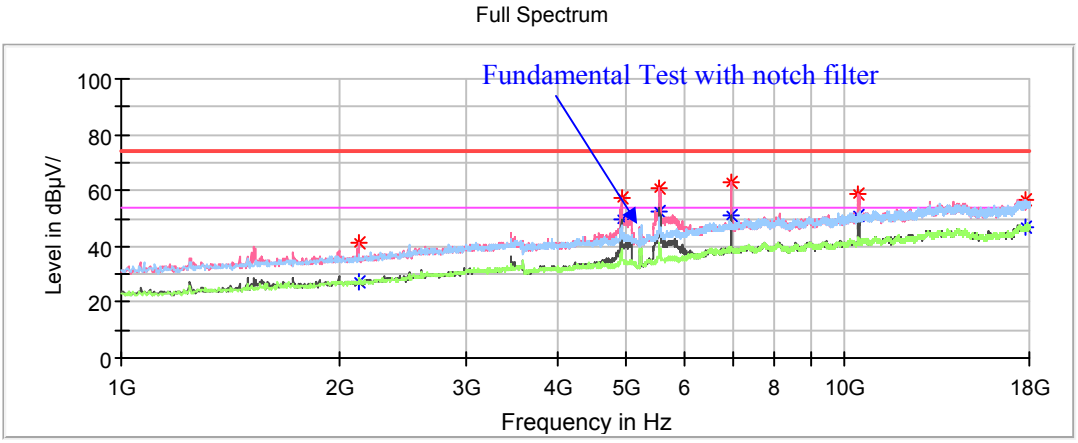
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5190MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1999.600000	41.79	---	250.0	V	223.0	-8.2	68.20	26.41
3454.800000	44.95	---	250.0	V	83.0	-3.6	68.20	23.25
4978.000000	---	39.02	200.0	V	35.0	-0.3	54.00	14.98
4978.000000	49.23	---	200.0	V	35.0	-0.3	74.00	24.77
5508.400000	56.50	---	200.0	V	16.0	1.4	68.20	11.70
6919.400000	64.71	---	150.0	V	88.0	5.2	68.20	3.49
17938.800000	---	48.29	150.0	H	90.0	13.6	54.00	5.71
17938.800000	56.74	---	150.0	H	90.0	13.6	74.00	17.26

High Channel: 5230MHz



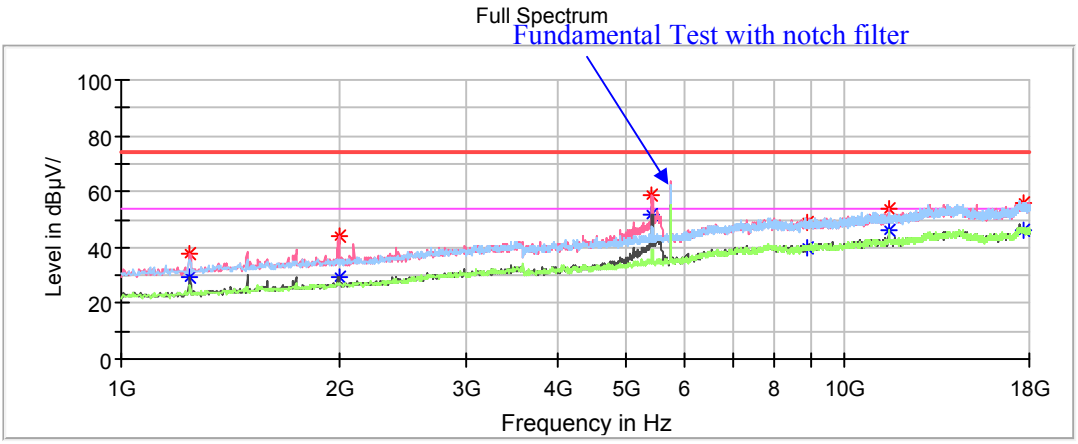
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
2128.800000	40.99	---	200.0	V	337.0	-7.9	68.20	27.21
4910.000000	---	49.61	200.0	V	42.0	-0.4	54.00	4.39
4910.000000	57.20	---	200.0	V	42.0	-0.4	74.00	16.80
5552.600000	60.78	---	150.0	V	10.0	1.5	68.20	7.42
6973.800000	62.63	---	150.0	V	77.0	5.3	68.20	5.57
10458.800000	58.59	---	250.0	V	52.0	8.9	68.20	9.61
17823.200000	---	47.00	100.0	H	270.0	13.8	54.00	7.00
17823.200000	56.62	---	100.0	H	270.0	13.8	74.00	17.38

5725-5850MHz Band:
1GHz-18GHz:

802.11a Mode(chain0):
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

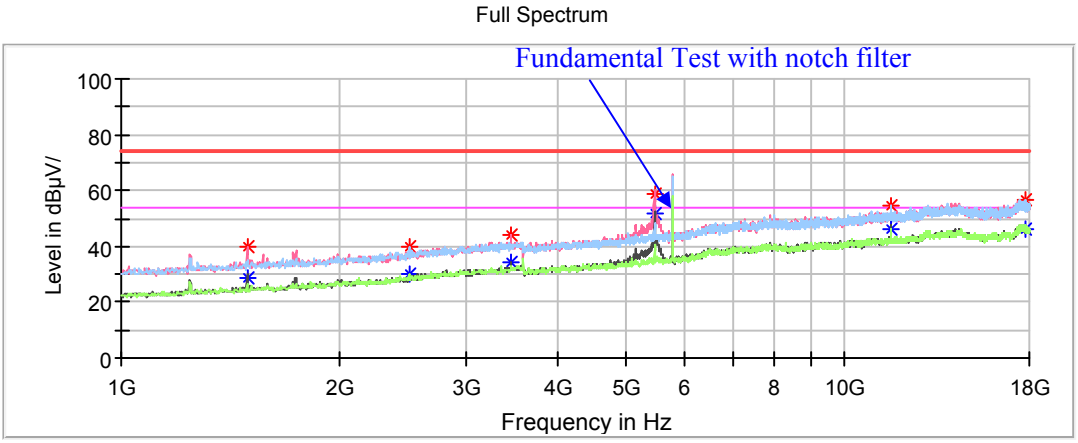
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz



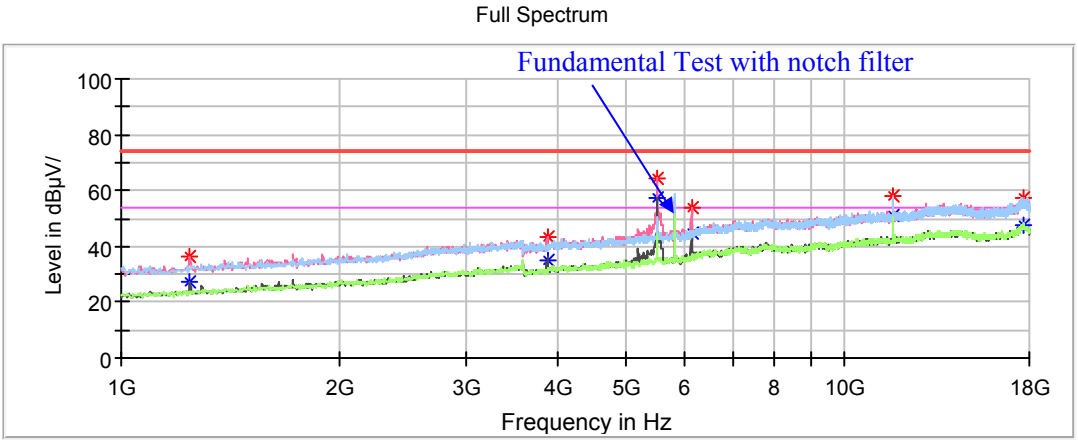
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1244.800000	37.93	---	200.0	V	9.0	-11.3	68.20	30.27
1999.600000	43.93	---	150.0	V	339.0	-8.2	68.20	24.27
5420.000000	---	51.87	200.0	V	351.0	1.1	54.00	2.13
5420.000000	58.41	---	200.0	V	351.0	1.1	74.00	15.59
8867.600000	48.90	---	200.0	H	20.0	7.3	68.20	19.30
11485.600000	---	46.01	150.0	V	34.0	9.8	54.00	7.99
11485.600000	53.81	---	150.0	V	34.0	9.8	74.00	20.19
17683.800000	55.98	---	200.0	H	189.0	14.0	68.20	12.22

Middle Channel: 5785MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1496.400000	---	28.61	200.0	V	0.0	-9.9	54.00	25.39
1496.400000	39.91	---	200.0	V	0.0	-9.9	74.00	34.09
2499.400000	---	29.94	200.0	H	358.0	-6.9	54.00	24.06
2499.400000	39.63	---	200.0	H	358.0	-6.9	74.00	34.37
3454.800000	44.32	---	200.0	V	136.0	-3.6	68.20	23.88
5454.800000	58.91	---	150.0	V	301.0	1.3	74.00	15.09
5457.400000	---	51.43	150.0	V	301.0	1.3	54.00	2.57
11570.600000	---	45.93	150.0	H	124.0	9.8	54.00	8.07
11570.600000	54.30	---	150.0	H	124.0	9.8	74.00	19.70
17819.800000	---	46.18	150.0	H	206.0	13.8	54.00	7.82
17819.800000	56.75	---	150.0	H	206.0	13.8	74.00	17.25

High Channel: 5825MHz



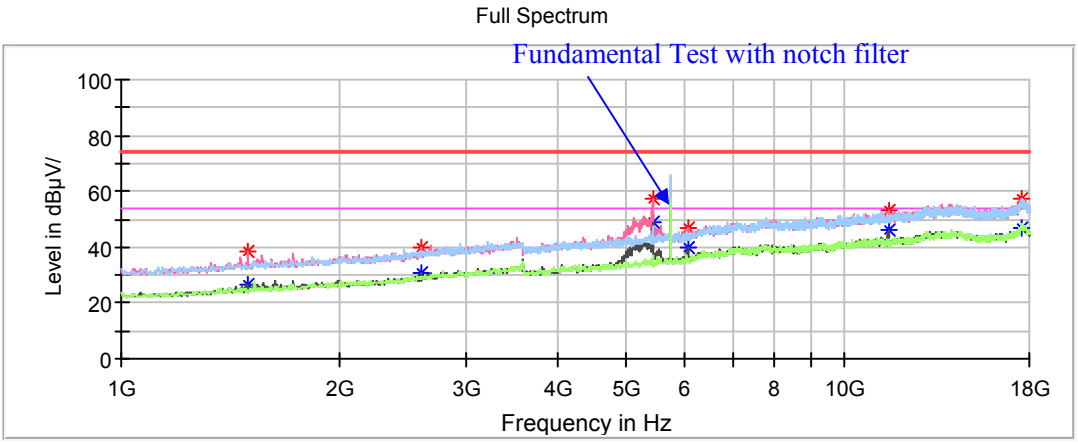
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1244.800000	36.41	---	200.0	V	13.0	-11.3	68.20	31.79
3879.800000	---	35.24	100.0	V	240.0	-2.3	54.00	18.76
3879.800000	43.64	---	100.0	V	240.0	-2.3	68.20	24.56
5505.000000	64.67	---	200.0	V	302.0	1.4	68.20	3.53
6140.800000	53.59	---	150.0	V	293.0	2.9	68.20	14.61
11648.800000	---	50.92	100.0	V	231.0	9.9	54.00	3.08
11648.800000	58.29	---	100.0	V	231.0	9.9	74.00	15.71
17653.200000	57.30	---	100.0	V	78.0	14.0	68.20	10.90

802.11a Mode(chain1):

*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

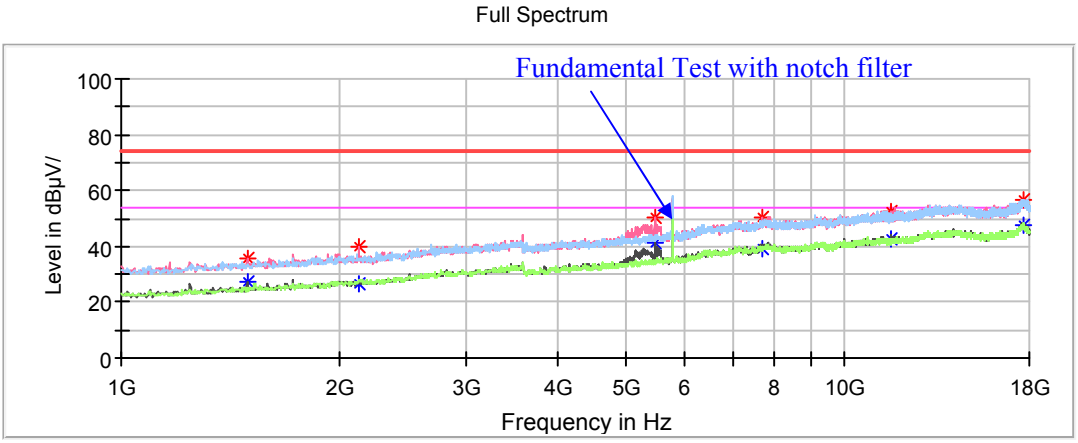
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz



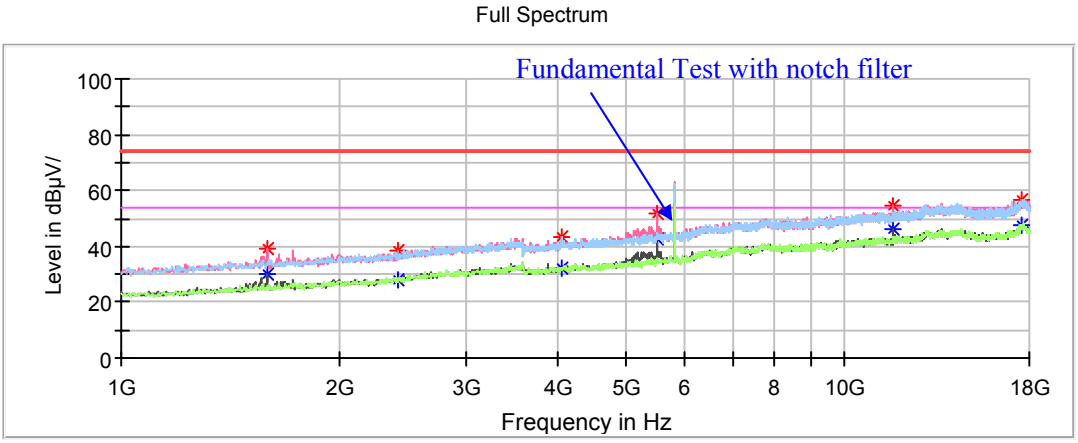
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1496.400000	38.25	---	150.0	V	60.0	-9.9	74.00	35.75
1496.400000	---	26.84	150.0	V	60.0	-9.9	54.00	27.16
2598.000000	39.69	---	200.0	V	199.0	-6.4	68.20	28.51
5423.400000	57.34	---	200.0	V	129.0	1.2	74.00	16.66
5423.400000	---	48.75	200.0	V	129.0	1.2	54.00	5.25
6066.000000	46.58	---	200.0	V	3.0	2.6	68.20	21.62
11485.600000	---	46.16	100.0	V	227.0	9.8	54.00	7.84
11485.600000	52.95	---	100.0	V	227.0	9.8	74.00	21.05
17541.000000	57.20	---	100.0	H	351.0	14.2	68.20	11.00

Middle Channel: 5785MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	27.20	200.0	V	54.0	-10.0	54.00	26.80
1493.000000	35.95	---	200.0	V	54.0	-10.0	74.00	38.05
2128.800000	39.59	---	200.0	V	307.0	-7.9	68.20	28.61
5464.200000	50.45	---	200.0	V	131.0	1.3	68.20	17.75
7674.200000	---	38.88	150.0	V	0.0	6.5	54.00	15.12
7674.200000	50.26	---	150.0	V	0.0	6.5	74.00	23.74
11577.400000	---	42.91	200.0	V	341.0	9.8	54.00	11.09
11577.400000	52.32	---	200.0	V	341.0	9.8	74.00	21.68
17649.800000	56.83	---	150.0	V	152.0	14.0	68.20	11.37

High Channel: 5825MHz



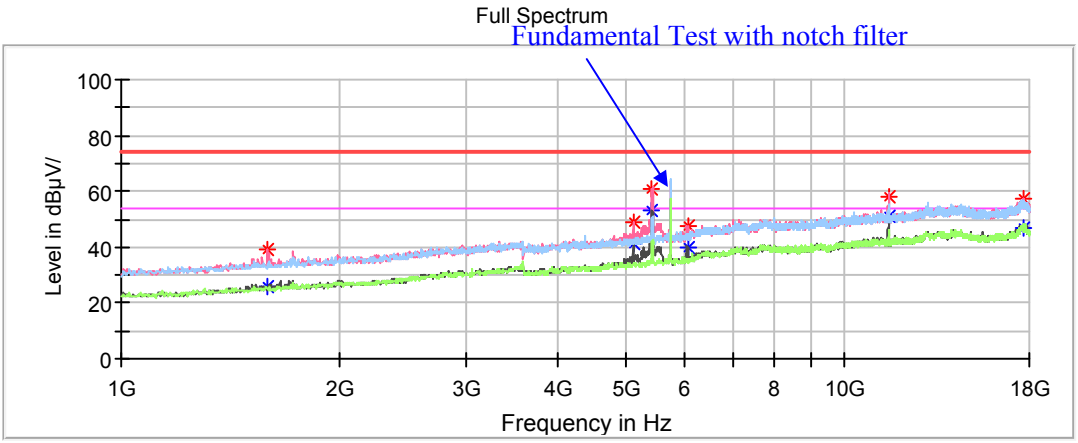
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	38.85	---	200.0	V	269.0	-9.6	74.00	35.15
1591.600000	---	30.15	200.0	V	269.0	-9.6	54.00	23.85
2411.000000	38.50	---	200.0	V	3.0	-7.2	68.20	29.70
4063.400000	---	32.47	100.0	H	279.0	-1.7	54.00	21.53
4063.400000	43.16	---	100.0	H	279.0	-1.7	74.00	30.84
5505.000000	51.83	---	100.0	V	45.0	1.4	68.20	16.37
11648.800000	---	46.25	100.0	V	186.0	9.9	54.00	7.75
11648.800000	54.73	---	100.0	V	186.0	9.9	74.00	19.27
17561.400000	56.76	---	100.0	V	256.0	14.2	68.20	11.44

802.11ac20 Mode(chain0+chain1):

*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

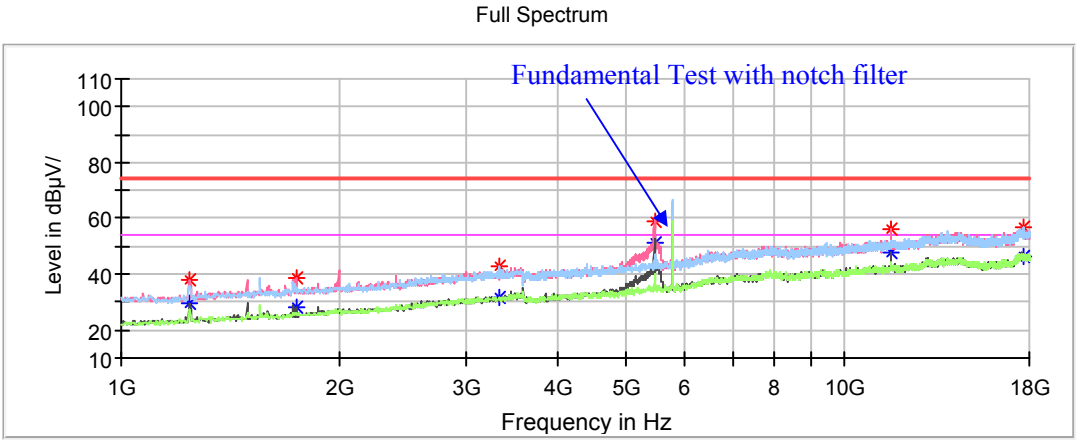
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz



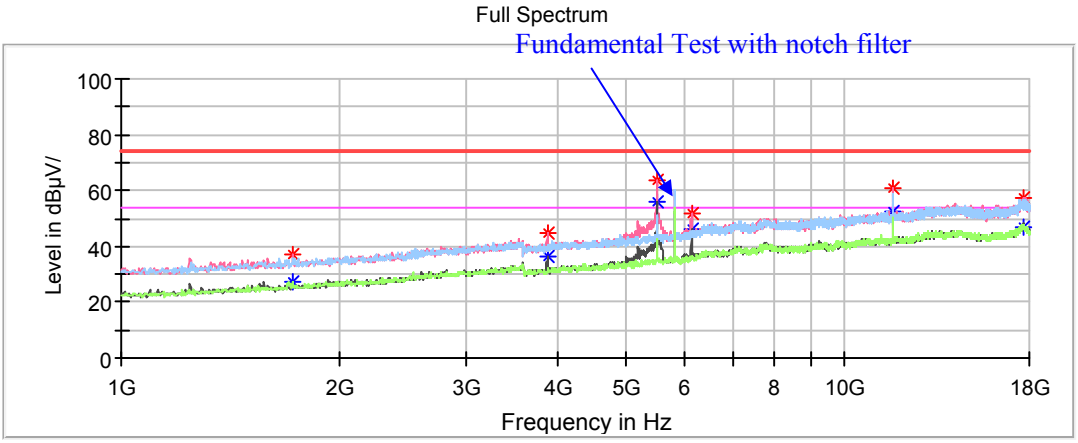
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	39.15	---	200.0	V	17.0	-9.6	74.00	34.85
1591.600000	---	25.97	200.0	V	17.0	-9.6	54.00	28.03
5107.200000	48.86	---	150.0	V	232.0	0.1	74.00	25.14
5107.200000	---	41.26	150.0	V	232.0	0.1	54.00	12.74
5420.000000	60.58	---	200.0	V	285.0	1.1	74.00	13.42
5420.000000	---	53.30	200.0	V	285.0	1.1	54.00	0.70
6069.400000	47.84	---	150.0	V	238.0	2.6	68.20	20.36
11489.000000	58.20	---	100.0	V	339.0	9.8	74.00	15.80
11489.000000	---	50.82	100.0	V	339.0	9.8	54.00	3.18
17636.200000	57.16	---	100.0	V	88.0	14.1	68.20	11.04

Middle Channel: 5785MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1244.800000	37.97	---	150.0	V	358.0	-11.3	68.20	30.23
1744.600000	38.96	---	200.0	V	106.0	-9.1	68.20	29.24
3332.400000	---	31.56	150.0	H	65.0	-3.8	54.00	22.44
3332.400000	42.71	---	150.0	H	65.0	-3.8	74.00	31.29
5457.400000	---	51.45	150.0	V	60.0	1.3	54.00	2.55
5457.400000	59.00	---	150.0	V	60.0	1.3	74.00	15.00
11577.400000	---	47.72	150.0	V	324.0	9.8	54.00	6.28
11577.400000	56.00	---	150.0	V	324.0	9.8	74.00	18.00
17666.800000	56.58	---	150.0	H	0.0	14.0	68.20	11.62

High Channel: 5825MHz

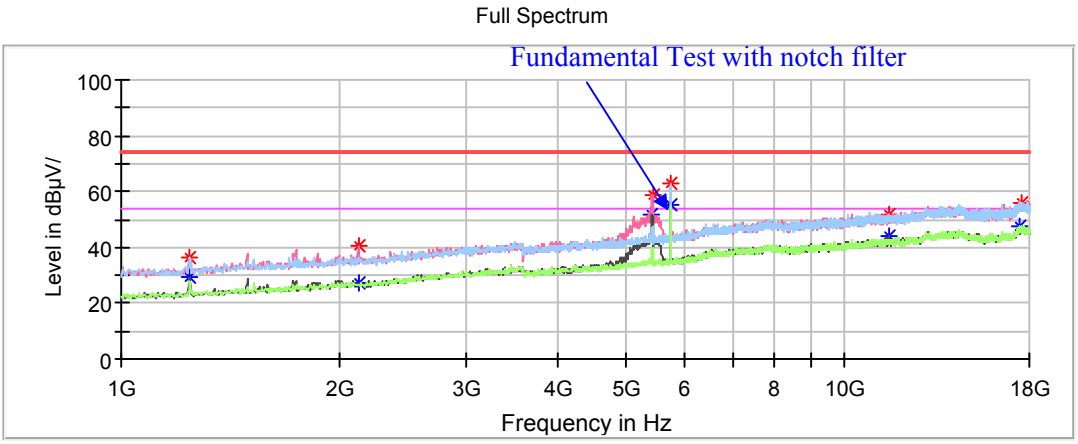


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1727.600000	37.28	---	200.0	V	217.0	-9.2	68.20	30.92
3883.200000	---	36.06	200.0	V	240.0	-2.3	54.00	17.94
3883.200000	44.65	---	200.0	V	240.0	-2.3	74.00	29.35
5508.400000	63.52	---	200.0	V	40.0	1.4	68.20	4.68
6140.800000	51.92	---	150.0	V	283.0	2.9	68.20	16.28
11659.000000	---	52.51	150.0	V	0.0	9.9	54.00	1.49
11659.000000	60.95	---	150.0	V	0.0	9.9	74.00	13.05
17680.400000	57.14	---	150.0	V	271.0	14.0	68.20	11.06

802.11n-HT20 Mode*(chain0+chain1):*
*(Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

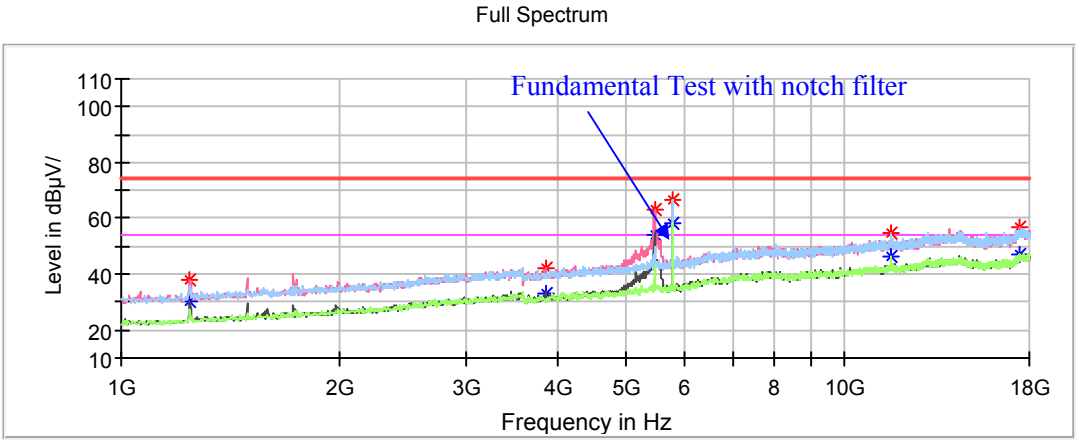
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz



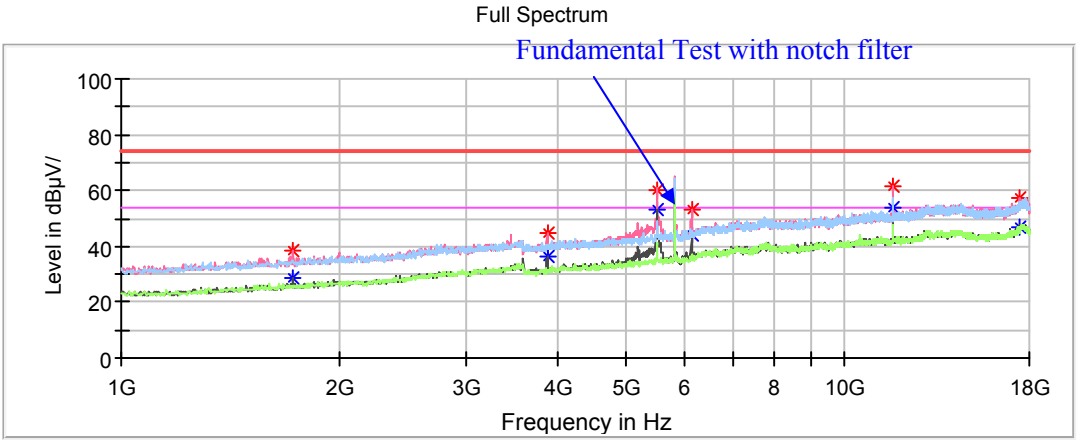
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1244.800000	36.57	---	150.0	V	0.0	-11.3	68.20	31.63
2125.400000	40.40	---	200.0	V	282.0	-7.9	68.20	27.80
5420.000000	---	51.45	200.0	V	350.0	1.1	54.00	2.55
5420.000000	58.67	---	200.0	V	350.0	1.1	74.00	15.33
11482.200000	---	44.13	200.0	V	350.0	9.8	54.00	9.87
11482.200000	51.61	---	200.0	V	350.0	9.8	74.00	22.39
17507.000000	55.66	---	150.0	H	219.0	14.3	68.20	12.54

Middle Channel: 5785MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1244.800000	37.96	---	150.0	V	64.0	-11.3	68.20	30.24
3856.000000	---	33.02	150.0	V	111.0	-2.3	54.00	20.98
3859.400000	42.13	---	200.0	V	251.0	-2.3	74.00	31.87
5457.400000	---	53.27	200.0	V	31.0	1.3	54.00	0.73
5457.200000	63.06	---	200.0	V	291.0	1.3	74.00	10.94
11577.400000	55.09	---	200.0	V	326.0	9.8	74.00	18.91
11577.400000	---	46.36	150.0	V	39.0	9.8	54.00	7.64
17445.800000	56.84	---	200.0	V	104.0	14.0	68.20	11.36

High Channel: 5825MHz



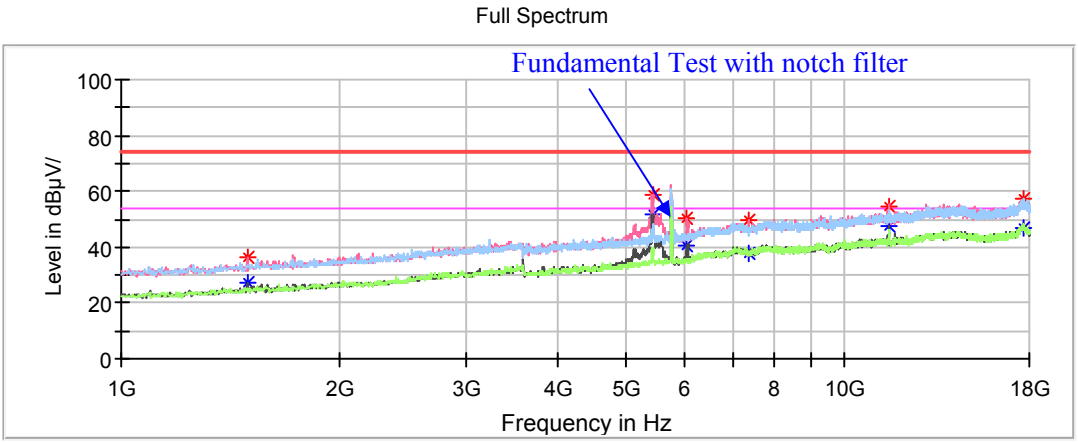
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1727.600000	38.33	---	100.0	V	0.0	-9.2	68.20	29.87
3879.800000	---	36.57	200.0	V	104.0	-2.3	54.00	17.43
3879.800000	44.74	---	200.0	V	104.0	-2.3	74.00	29.26
5501.600000	59.85	---	200.0	V	305.0	1.4	68.20	8.35
6144.200000	53.09	---	200.0	V	233.0	2.9	68.20	15.11
11659.000000	---	53.31	100.0	V	227.0	9.9	54.00	0.69
11659.000000	61.87	---	100.0	V	227.0	9.9	74.00	12.13
17496.800000	57.55	---	200.0	V	293.0	14.3	68.20	10.65

802.11ac40 Mode(chain0+chain1):

*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

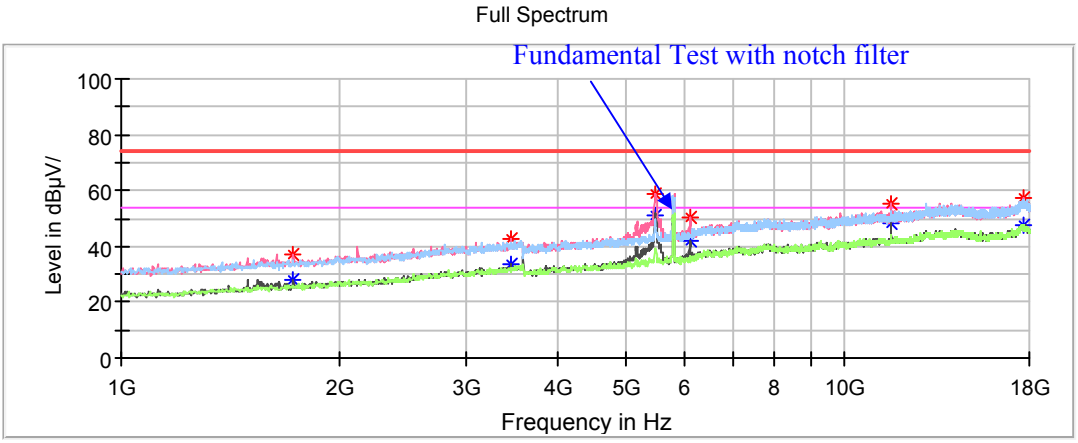
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5755MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	27.59	200.0	V	54.0	-10.0	54.00	26.41
1493.000000	36.24	---	200.0	V	54.0	-10.0	74.00	37.76
5437.000000	---	51.40	200.0	V	302.0	1.2	54.00	2.60
5437.000000	58.79	---	200.0	V	302.0	1.2	74.00	15.21
6059.200000	50.46	---	200.0	V	242.0	2.5	68.20	17.74
7351.200000	---	37.85	150.0	V	247.0	5.9	54.00	16.15
7351.200000	49.85	---	150.0	V	247.0	5.9	74.00	24.15
11502.600000	---	47.73	150.0	V	356.0	9.8	54.00	6.27
11502.600000	54.63	---	150.0	V	356.0	9.8	74.00	19.37
17677.000000	57.46	---	200.0	H	0.0	14.0	68.20	10.74

High Channel: 5795MHz

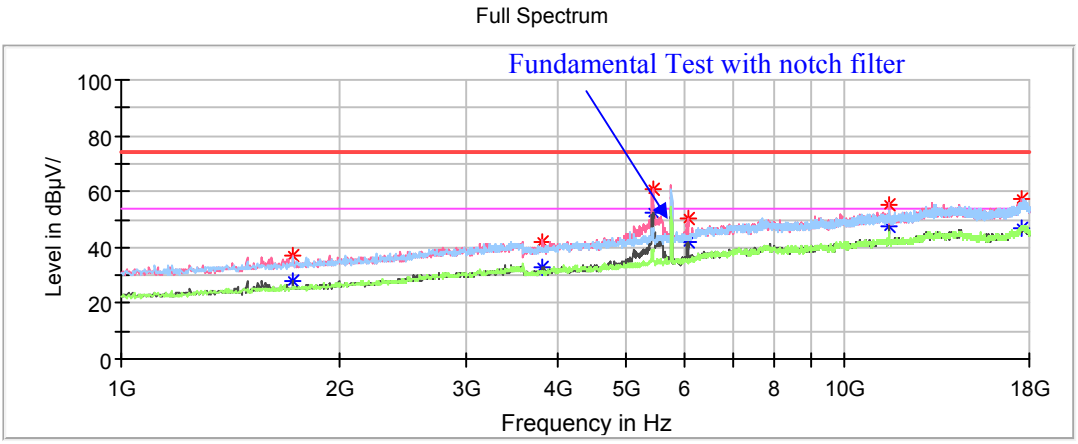


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1727.600000	37.36	---	200.0	V	210.0	-9.2	68.20	30.84
3454.800000	42.91	---	200.0	V	3.0	-3.6	68.20	25.29
5464.200000	58.85	---	150.0	V	346.0	1.3	68.20	9.35
6123.800000	50.13	---	150.0	V	277.0	2.8	68.20	18.07
11597.800000	---	48.34	150.0	V	0.0	9.8	54.00	5.66
11597.800000	55.40	---	150.0	V	0.0	9.8	74.00	18.60
17663.400000	57.08	---	200.0	V	3.0	14.0	68.20	11.12

802.11n-HT40 Mode*(chain0+chain1)*:
*(Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

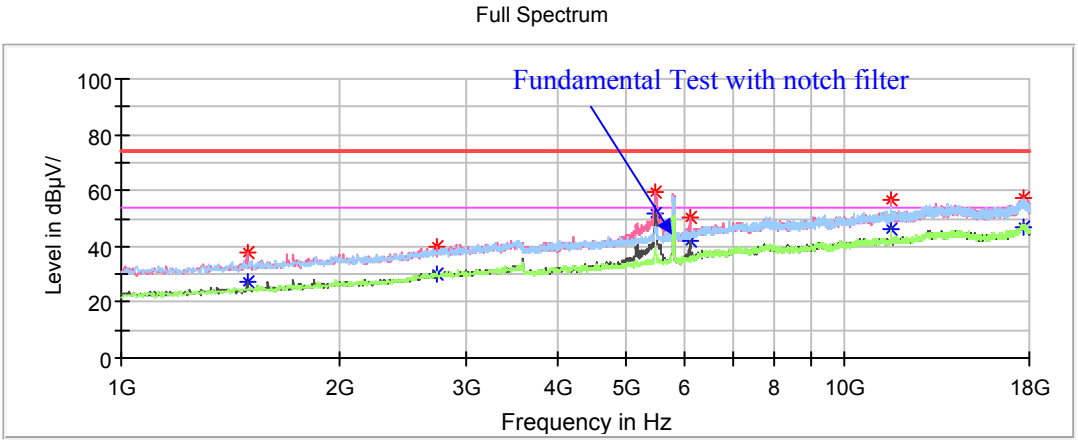
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5755MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1727.600000	37.40	---	200.0	V	218.0	-9.2	68.20	30.80
3828.800000	---	33.08	150.0	V	78.0	-2.4	54.00	20.92
3828.800000	42.26	---	150.0	V	78.0	-2.4	74.00	31.74
5433.600000	---	52.13	200.0	V	19.0	1.2	54.00	1.87
5433.600000	60.80	---	200.0	V	19.0	1.2	74.00	13.20
6066.000000	50.14	---	150.0	V	236.0	2.6	68.20	18.06
11502.600000	---	47.40	150.0	V	0.0	9.8	54.00	6.60
11502.600000	55.11	---	150.0	V	0.0	9.8	74.00	18.89
17564.800000	57.46	---	150.0	V	283.0	14.2	68.20	10.74

High Channel: 5795MHz



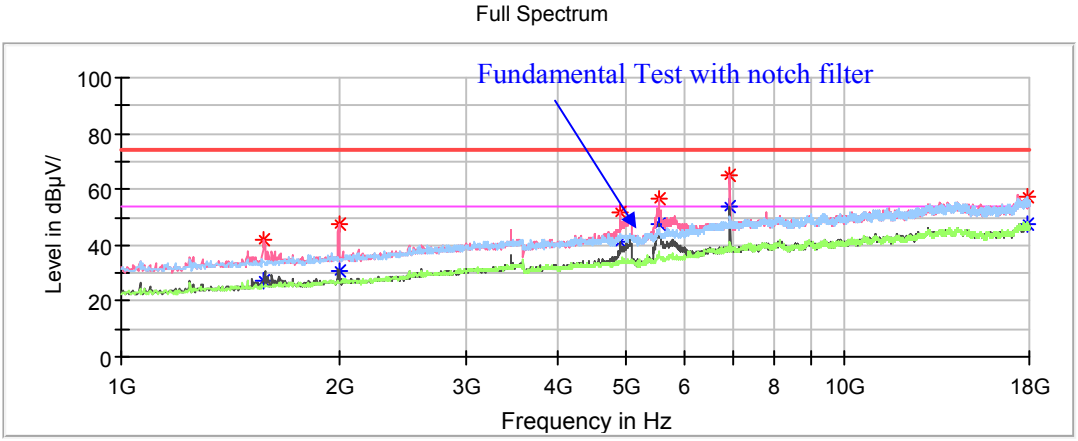
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1493.000000	---	27.47	200.0	V	59.0	-10.0	54.00	26.53
1493.000000	37.64	---	200.0	V	59.0	-10.0	74.00	36.36
2730.600000	---	30.29	150.0	V	141.0	-5.7	54.00	23.71
2730.600000	39.63	---	150.0	V	141.0	-5.7	74.00	34.37
5474.400000	59.64	---	150.0	V	289.0	1.3	68.20	8.56
6123.800000	50.12	---	200.0	V	235.0	2.8	68.20	18.08
11597.800000	---	46.08	150.0	V	231.0	9.8	54.00	7.92
11597.800000	56.32	---	150.0	V	231.0	9.8	74.00	17.68
17666.800000	57.46	---	200.0	V	319.0	14.0	68.20	10.74

802.11ac80 Mode(chain0+chain1):

*(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5210MHz



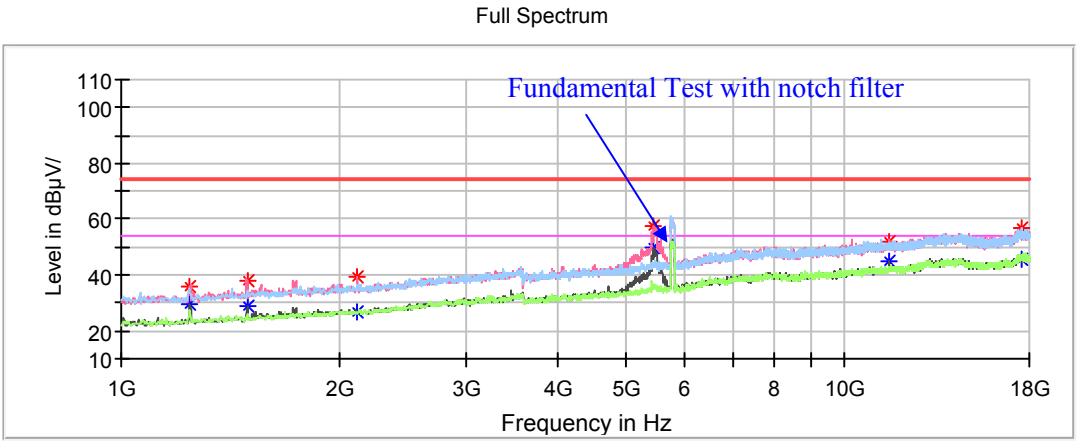
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1574.600000	41.93	---	200.0	V	149.0	-9.7	68.20	26.27
1999.600000	47.26	---	250.0	V	100.0	-8.2	68.20	20.94
4889.600000	---	41.56	200.0	V	79.0	-0.4	54.00	12.44
4889.600000	51.76	---	200.0	V	79.0	-0.4	74.00	22.24
5528.800000	56.55	---	150.0	V	10.0	1.5	68.20	11.65
6946.600000	64.71	---	150.0	V	78.0	5.2	68.20	3.49
17921.800000	---	47.38	200.0	H	205.0	13.6	54.00	6.62
17921.800000	57.30	---	200.0	H	205.0	13.6	74.00	16.70

802.11ac80 Mode(chain0+chain1):

*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)*

Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5775MHz

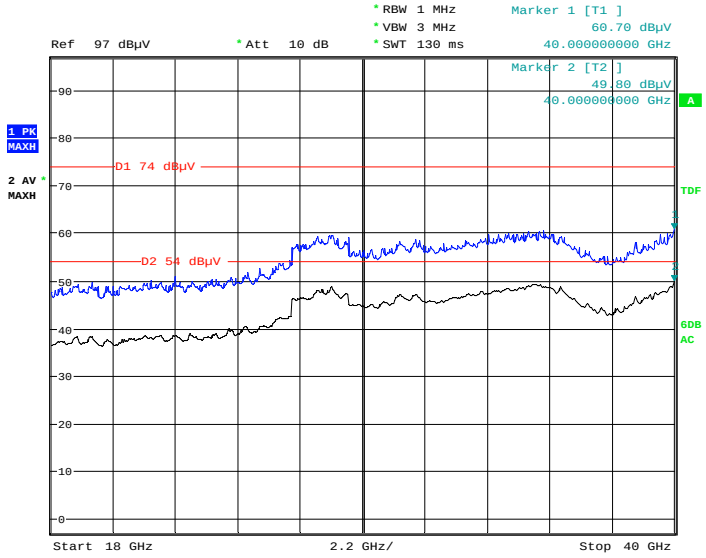


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1244.800000	36.06	---	150.0	V	356.0	-11.3	68.20	32.14
1493.000000	---	28.61	150.0	V	11.0	-10.0	54.00	25.39
1493.000000	37.85	---	150.0	V	11.0	-10.0	74.00	36.15
2122.000000	39.49	---	200.0	V	101.0	-7.9	68.20	28.71
5454.000000	---	50.16	200.0	V	136.0	1.3	54.00	3.84
5454.000000	57.37	---	200.0	V	136.0	1.3	74.00	16.63
11519.600000	---	44.95	200.0	V	356.0	9.8	54.00	9.05
11519.600000	51.98	---	200.0	V	356.0	9.8	74.00	22.02
17561.400000	56.62	---	150.0	H	175.0	14.2	68.20	11.58

18GHz-40GHz (5150-5250MHz Band):

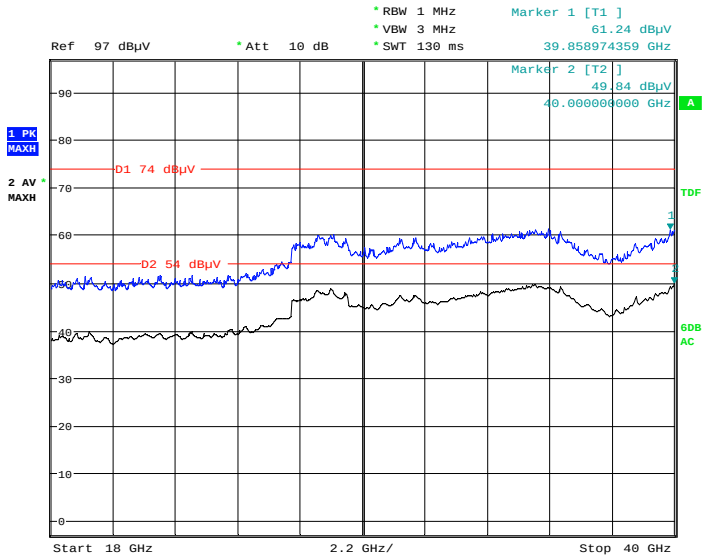
Pre-scan with 802.11a and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case ***low channel of 802.11n-HT20 mode in Z-axis of orientation*** *was recorded*

Horizontal



Date: 27.JUL.2019 16:37:43

Vertical

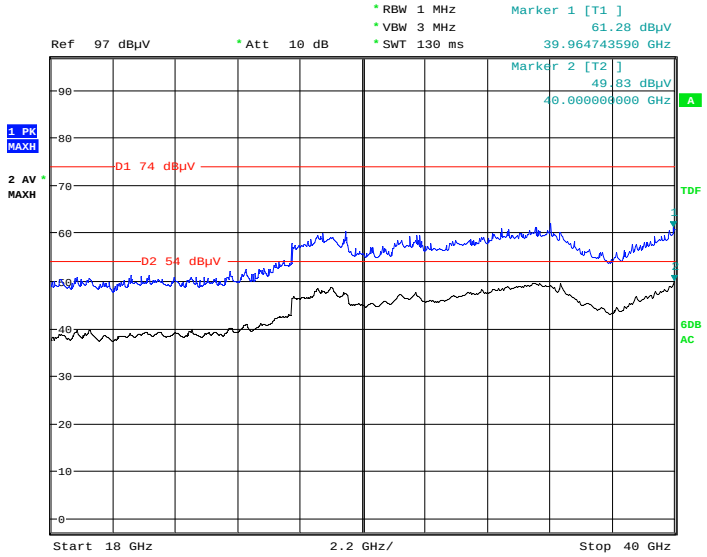


Date: 27.JUL.2019 16:03:47

18GHz-40GHz (5725-5850 Band):

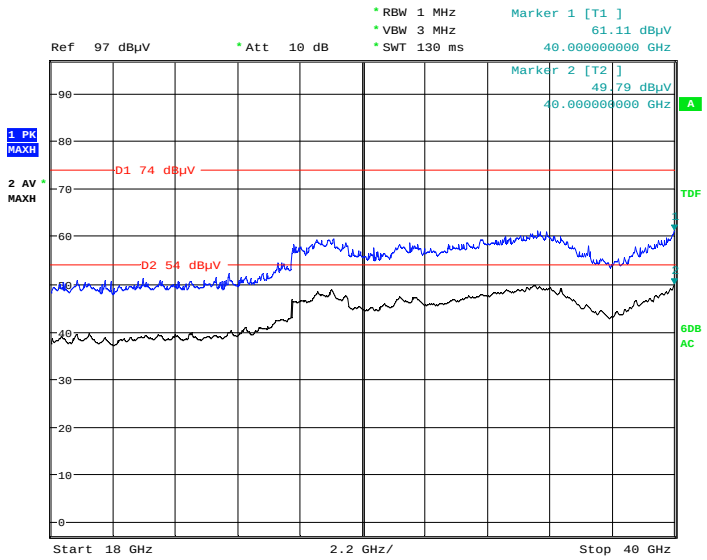
Pre-scan with 802.11a and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case ***middle channel of 802.11n-HT20 mode in Z-axis of orientation*** *was recorded*

Horizontal



Date: 27.JUL.2019 18:44:38

Vertical



Date: 27.JUL.2019 18:11:03

Note: For bandege which was tested without amplifier and the test distance is 1.0m.

Fundamental Test & Restricted Bands Emissions Test (5150-5250MHz Band):

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

802.11a Mode-Chain0: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5180MHz										
5150.000000	---	60.96	150	V	219	38.8	---	51.42	54	2.58
5150.000000	71.38	---	150	V	219	38.8	61.84	---	74	12.16
High Channel: 5240MHz										
5350.000000	---	60.77	200	V	25	39.3	---	51.23	54	2.77
5350.000000	69.58	---	200	V	25	39.3	60.04	---	74	13.96

802.11a Mode-Chain1: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5180MHz										
5150.000000	---	62.41	150	V	285	38.8	---	52.87	54	1.13
5150.000000	72.16	---	150	V	285	38.8	62.62	---	74	11.38
High Channel: 5240MHz										
5350.000000	70.42	61.63	200	V	217	39.3	---	52.09	54	1.91
5350.000000	63.88	---	200	V	217	39.3	54.34	---	74	19.66

802.11ac20 Mode (Chain0+ Chain1): *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5180MHz										
5150.000000	---	62.52	150	V	272	38.8	---	52.98	54	1.02
5150.000000	72.33	---	150	V	272	38.8	62.79	---	74	11.21
High Channel: 5240MHz										
5350.000000	---	60.65	200	V	148	39.3	---	51.11	54	2.89
5350.000000	70.47	---	200	V	148	39.3	60.93	---	74	13.07

802.11n-HT20 Mode (Chain0+ Chain1): *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5180MHz										
5150.000000	---	62.48	150	V	142	38.8	---	52.94	54	1.06
5150.000000	72.11	---	150	V	142	38.8	62.57	---	74	11.43
High Channel: 5240MHz										
5350.000000	---	61.71	200	V	74	39.3	---	52.17	54	1.83
5350.000000	70.52	---	200	V	74	39.3	60.98	---	74	13.02

802.11ac40 Mode (Chain0+ Chain1): *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5190MHz										
5150.000000	---	62.76	150	V	222	38.8	---	53.22	54	0.78
5150.000000	72.02	---	150	V	222	38.8	62.48	---	74	11.52
High Channel: 5230MHz										
5350.000000	---	61.01	200	V	47	39.3	---	51.47	54	2.53
5350.000000	71.40	---	200	V	47	39.3	61.86	---	74	12.14

802.11n-HT40 Mode (Chain0+ Chain1): *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5190MHz										
5150.000000	---	62.78	150	V	118	38.8	---	53.24	54	0.76
5150.000000	72.23	---	150	V	118	38.8	62.69	---	74	11.31
High Channel: 5230MHz										
5350.000000	---	61.12	200	V	283	39.3	---	51.58	54	2.42
5350.000000	69.82	---	200	V	283	39.3	60.28	---	74	13.72

802.11ac80 Mode (Chain0+ Chain1): *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBµV /m)	Average (dBµV /m)		
Low Channel: 5210MHz										
5150.000000	---	62.87	150	V	50	38.8	---	53.33	54	0.67
5150.000000	70.80	---	150	V	50	38.8	61.26	---	74	12.74
5350.000000	---	61.41	200	V	37	39.3	---	51.87	54	2.13
5350.000000	70.69	---	200	V	37	39.3	61.15	---	74	12.85

Fundamental Test & Restricted Bands Emissions Test (5725-5850MHz band):

Note:
1. Corrected Factor = Antenna factor (RX) + Cable Loss
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

2. The test distance is 1m instead of 3m, Extrapolation Factor=20*log(3m /1m)=9.54dB
Extrapolation Result(dBμV/m)= Corrected Amplitude (dBμV/m) - Extrapolation Factor(dB)

802.11a Mode-chain0: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5745MHz										
5650.000000	71.39	---	150	V	87	39.9	61.85	---	68.20	6.35
5700.000000	79.56	---	150	V	75	39.9	70.02	---	105.20	35.18
5720.000000	82.56	---	150	V	59	39.9	73.02	---	110.80	37.78
5725.000000	101.34	---	150	V	18	39.9	91.80	---	122.20	30.40
High Channel: 5825MHz										
5850.000000	95.69	---	150	V	56	40.3	86.15	---	122.20	36.05
5855.000000	87.56	---	150	V	63	40.3	78.02	---	110.80	32.78
5875.000000	78.54	---	150	V	261	40.3	69.00	---	105.20	36.20
5925.000000	72.47	---	150	V	282	40.3	62.93	---	68.20	5.27

802.11a Mode-chain1: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5745MHz										
5650.000000	71.36	---	150	V	195	39.9	61.82	---	68.20	6.38
5700.000000	72.23	---	150	V	270	39.9	62.69	---	105.20	42.51
5720.000000	85.56	---	150	V	235	39.9	76.02	---	110.80	34.78
5725.000000	90.04	---	150	V	143	39.9	80.50	---	122.20	41.70
High Channel: 5825MHz										
5850.000000	91.34	---	150	V	87	40.3	81.80	---	122.20	40.40
5855.000000	84.57	---	150	V	357	40.3	75.03	---	110.80	35.77
5875.000000	73.45	---	150	V	208	40.3	63.91	---	105.20	41.29
5925.000000	72.23	---	150	V	113	40.3	62.69	---	68.20	5.51

802.11ac20 Mode-Chain0+ Chain1: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5745MHz										
5650.000000	72.05	---	150	V	318	39.9	62.51	---	68.20	5.69
5700.000000	78.86	---	150	V	24	39.9	69.32	---	105.20	35.88
5720.000000	93.51	---	150	V	89	39.9	83.97	---	110.80	26.83
5725.000000	102.84	---	150	V	221	39.9	93.30	---	122.20	28.90
High Channel: 5825MHz										
5850.000000	103.21	---	150	V	355	40.3	93.67	---	122.20	28.53
5855.000000	86.47	---	150	V	298	40.3	76.93	---	110.80	33.87
5875.000000	78.67	---	150	V	87	40.3	69.13	---	105.20	36.07
5925.000000	71.38	---	150	V	214	40.3	61.84	---	68.20	6.36

802.11n-HT20 Mode- Chain0+ Chain1: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5745MHz										
5650.000000	71.12	---	150	V	28	39.9	61.58	---	68.20	6.62
5700.000000	76.34	---	150	V	77	39.9	66.80	---	105.20	38.40
5720.000000	92.45	---	150	V	186	39.9	82.91	---	110.80	27.89
5725.000000	101.67	---	150	V	3	39.9	92.13	---	122.20	30.07
High Channel: 5825MHz										
5850.000000	103.45	---	150	V	166	40.3	93.91	---	122.20	28.29
5855.000000	90.58	---	150	V	1	40.3	81.04	---	110.80	29.76
5875.000000	77.85	---	150	V	207	40.3	68.31	---	105.20	36.89
5925.000000	71.84	---	150	V	136	40.3	62.30	---	68.20	5.90

802.11ac40 Mode- Chain0+ Chain1: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5755MHz										
5650.000000	76.29	---	150	V	11	39.9	66.75	---	68.20	1.45
5700.000000	92.58	---	150	V	138	39.9	83.04	---	105.20	22.16
5720.000000	107.69	---	150	V	130	39.9	98.15	---	110.80	12.65
5725.000000	110.09	---	150	V	54	39.9	100.55	---	122.20	21.65
High Channel: 5795MHz										
5850.000000	87.21	---	150	V	82	40.3	77.67	---	122.20	44.53
5855.000000	86.54	---	150	V	38	40.3	77.00	---	110.80	33.80
5875.000000	80.44	---	150	V	231	40.3	70.90	---	105.20	34.30
5925.000000	72.31	---	150	V	35	40.3	62.77	---	68.20	5.43

802.11n-HT40 Mode- Chain0+ Chain1: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBμV /m)	Average (dBμV /m)		
Low Channel: 5755MHz										
5650.000000	76.01	---	150	V	146	39.9	66.47	---	68.20	1.73
5700.000000	90.87	---	150	V	137	39.9	81.33	---	105.20	23.87
5720.000000	107.56	---	150	V	117	39.9	98.02	---	110.80	12.78
5725.000000	109.43	---	150	V	22	39.9	99.89	---	122.20	22.31
High Channel: 5795MHz										
5850.000000	86.67	---	150	V	153	40.3	77.13	---	122.20	45.07
5855.000000	84.11	---	150	V	15	40.3	74.57	---	110.80	36.23
5875.000000	80.05	---	150	V	9	40.3	70.51	---	105.20	34.69
5925.000000	71.03	---	150	V	124	40.3	61.49	---	68.20	6.71

802.11ac80 Mode- Chain0+ Chain1: *(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)*

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Extrapolation Result@3m		Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)			MaxPeak (dBµV /m)	Average (dBµV /m)		
Low Channel: 5775MHz										
5650.000000	76.58	---	150	V	278	39.9	67.04	---	68.20	1.16
5700.000000	86.57	---	150	V	284	39.9	77.03	---	105.20	28.17
5720.000000	88.41	---	150	V	29	39.9	78.87	---	110.80	31.93
5725.000000	88.68	---	150	V	307	39.9	79.14	---	122.20	43.06
5850.000000	86.13	---	150	V	98	40.3	76.59	---	122.20	45.61
5855.000000	85.64	---	150	V	219	40.3	76.10	---	110.80	34.70
5875.000000	81.58	---	150	V	112	40.3	72.04	---	105.20	33.16
5925.000000	73.11	---	150	V	302	40.3	63.57	---	68.20	4.63

FCC §15.407(a) &§15.407(e)–EMISSION BANDWIDTH

Applicable Standard

.
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

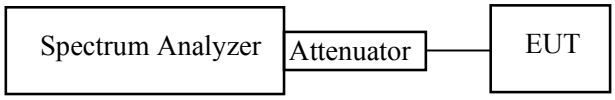
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. **Minimum Emission Bandwidth for the band 5.725-5.85 GHz**
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	24.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Max Min on 2019-07-25.

Test Result: Pass.

5150-5250 MHz:

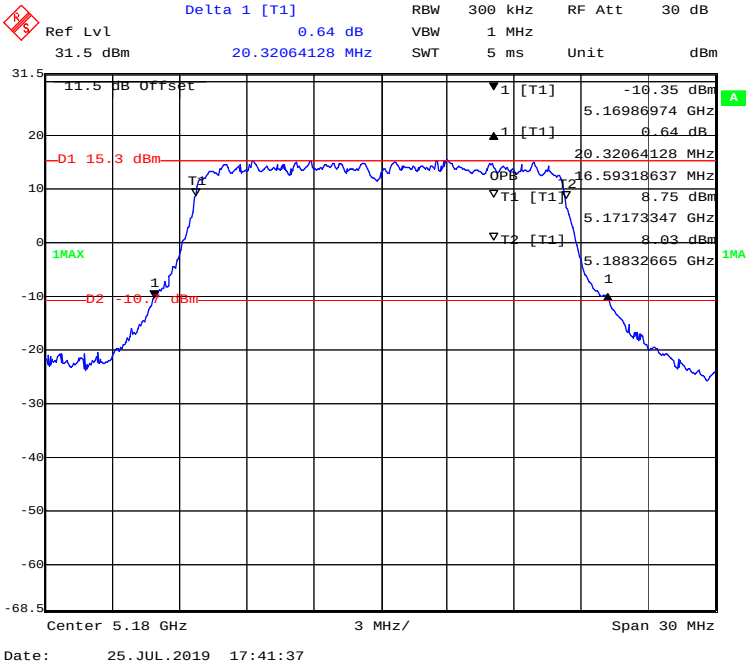
Test mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			Chain0	Chain1	Chain0	Chain1
802.11a	Low	5180	20.321	20.441	16.593	16.593
	Middle	5200	20.461	21.764	16.593	16.754
	High	5240	20.561	22.124	16.653	16.673
802.11ac20	Low	5180	20.741	20.842	17.735	17.715
	Middle	5200	20.922	21.884	17.735	17.796
	High	5240	21.162	21.964	17.735	17.796
802.11n-HT20	Low	5180	20.681	20.842	17.735	17.715
	Middle	5200	21.062	21.162	17.735	17.715
	High	5240	21.102	21.162	17.735	17.715
802.11ac40	Low	5190	40.190	40.441	35.952	36.072
	High	5230	40.471	40.521	36.072	36.072
802.11n-HT40	Low	5190	40.401	40.561	35.952	36.072
	High	5230	40.230	40.521	36.072	36.072
802.11ac80	Low	5210	84.309	84.329	75.992	75.992

5725-5850MHz:

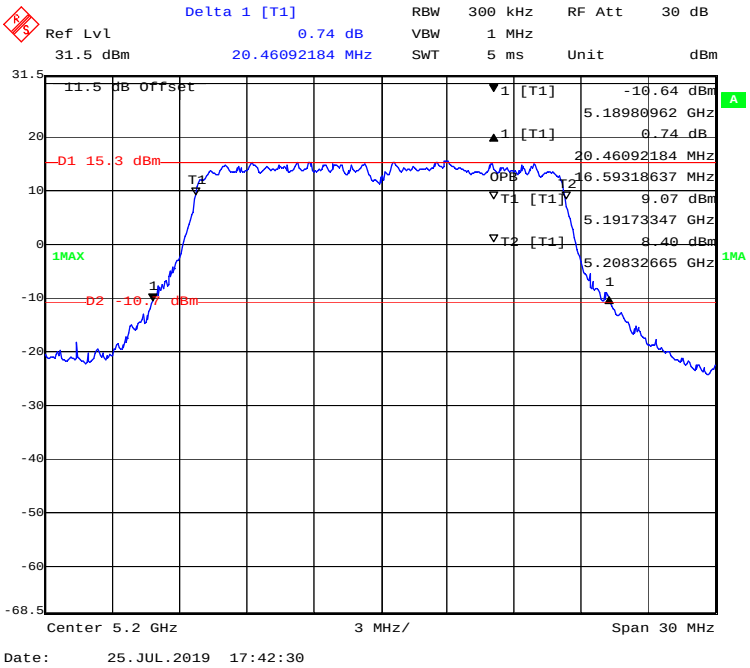
Test mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		99% Bandwidth (MHz)		Limit (MHz)
			Chain0	Chain1	Chain0	Chain1	
802.11a	Low	5745	16.293	16.353	16.954	16.593	≥0.5
	Middle	5785	16.353	16.413	16.834	16.593	≥0.5
	High	5825	16.293	16.353	17.194	16.713	≥0.5
802.11ac20	Low	5745	17.555	17.555	17.916	17.735	≥0.5
	Middle	5785	17.615	17.555	17.916	17.735	≥0.5
	High	5825	17.615	17.555	18.156	17.796	≥0.5
802.11n-HT20	Low	5745	17.615	17.555	17.976	17.735	≥0.5
	Middle	5785	17.615	17.615	17.916	17.735	≥0.5
	High	5825	17.615	17.615	18.096	17.856	≥0.5
802.11ac40	Low	5755	35.381	35.501	36.192	36.072	≥0.5
	High	5795	35.351	35.180	36.313	36.072	≥0.5
802.11n-HT40	Low	5755	35.351	35.230	36.192	36.072	≥0.5
	High	5795	35.271	35.511	36.313	36.072	≥0.5
802.11ac80	Low	5775	76.052	76.533	76.232	75.992	≥0.5

5150-5250 MHz Band:
chain0:
26 Bandwidth&99% Occupied Bandwidth

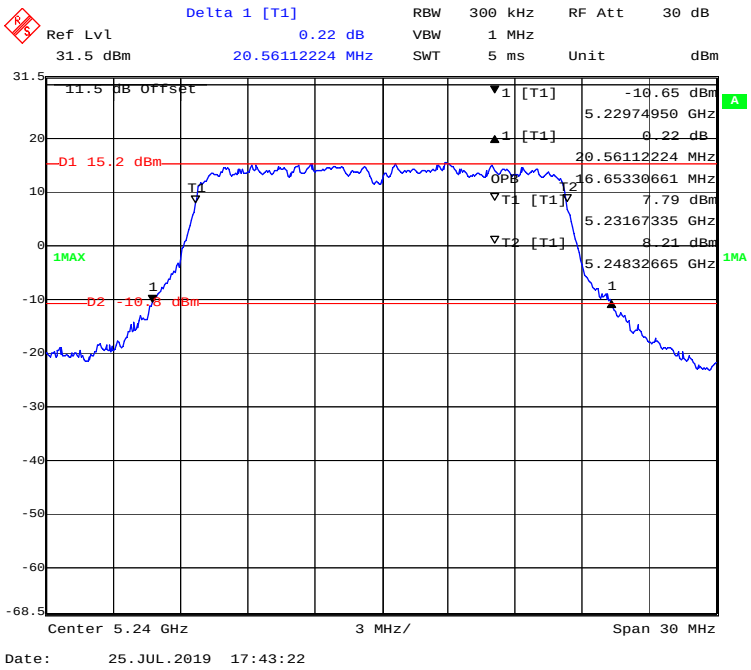
802.11a mode, 5180MHz



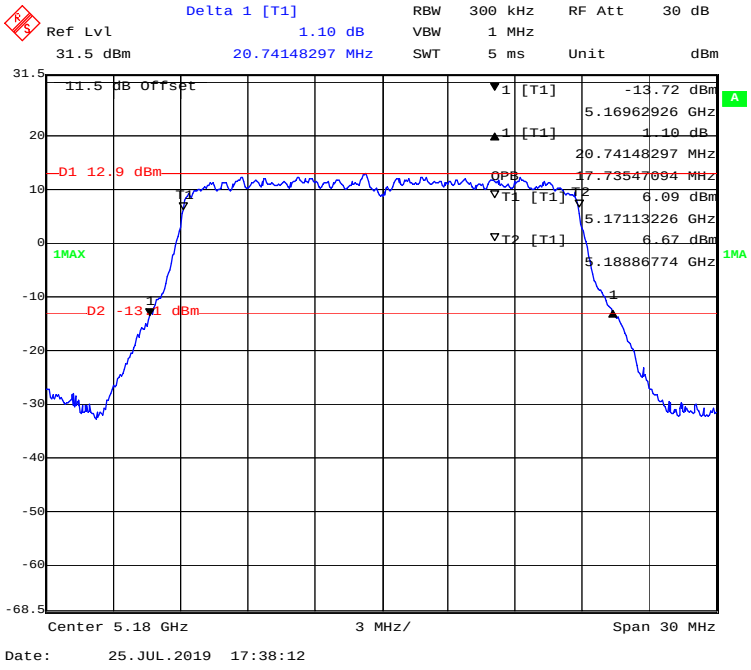
802.11a mode, 5200MHz



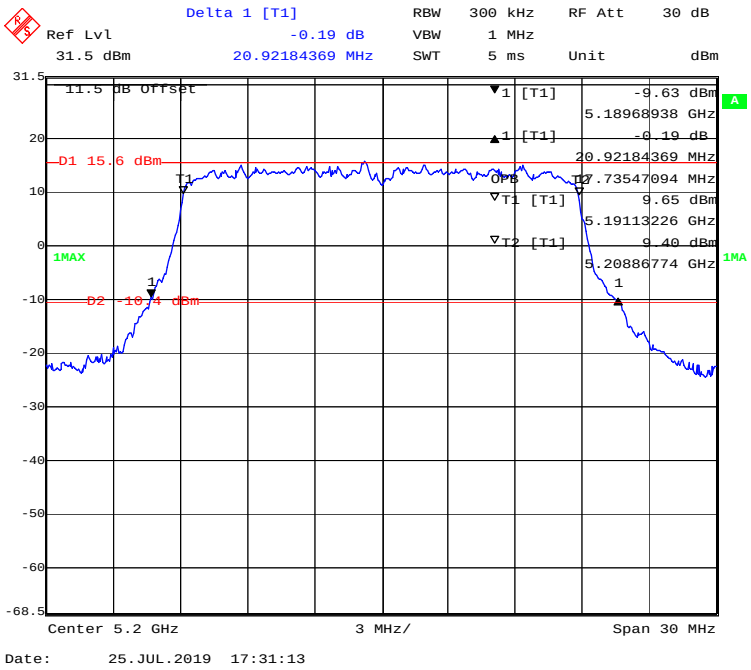
802.11a mode, 5240MHz



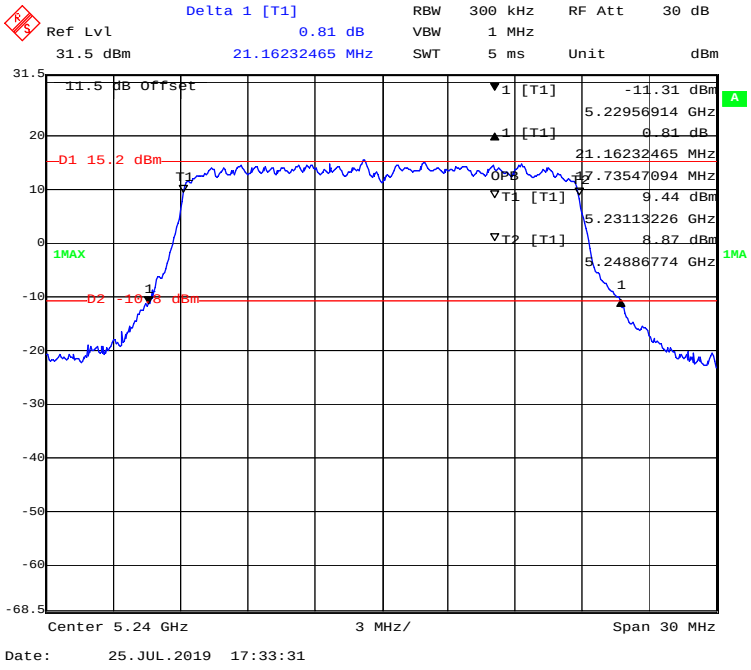
802.11ac20 mode, 5180MHz



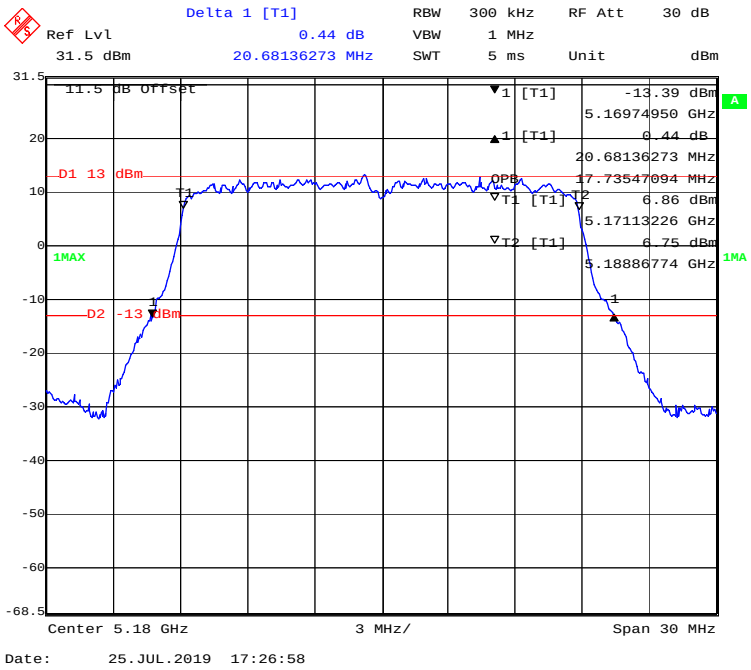
802.11 ac20 mode, 5200MHz



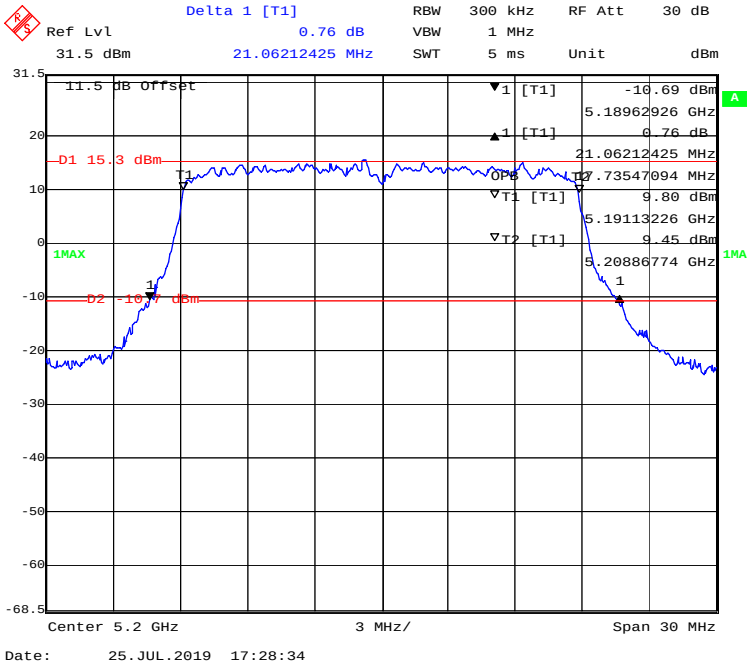
802.11 ac20 mode, 5240MHz



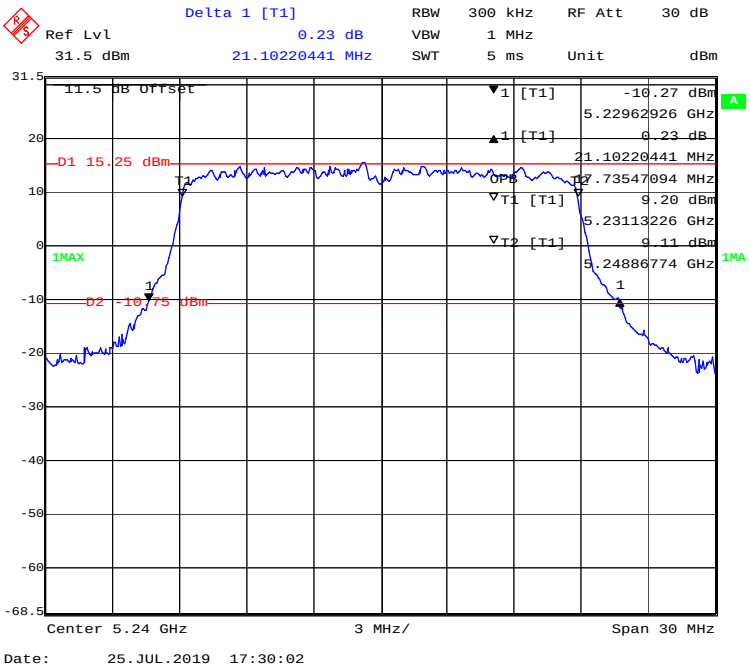
802.11n-HT20 mode, 5180MHz



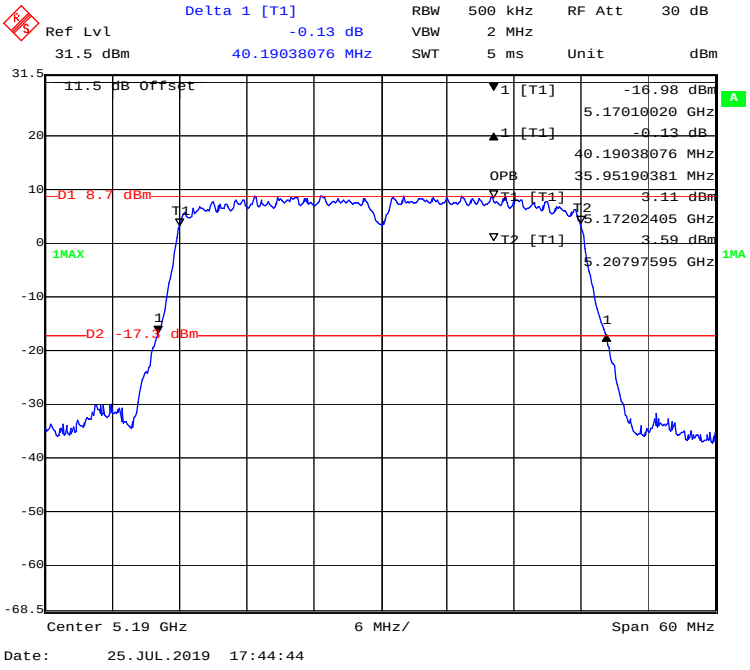
802.11n-HT20 mode, 5200MHz



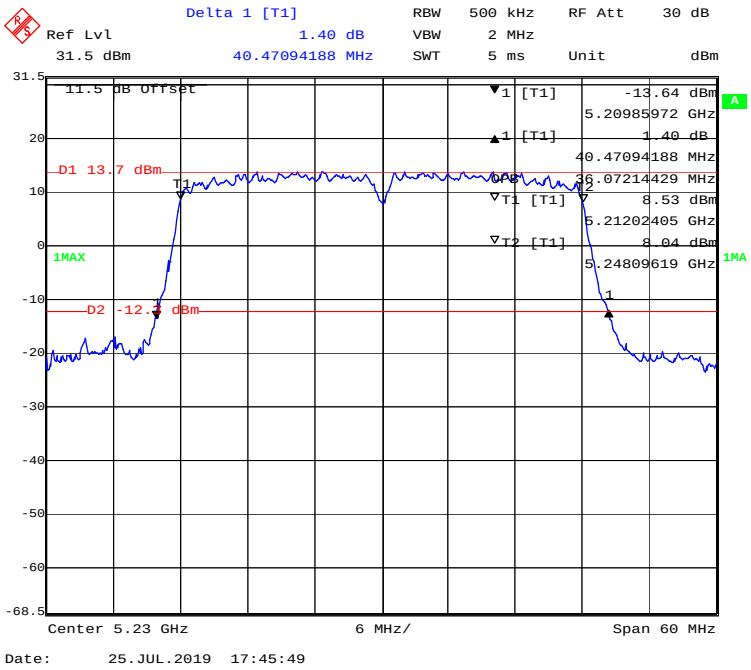
802.11n-HT20 mode, 5240MHz



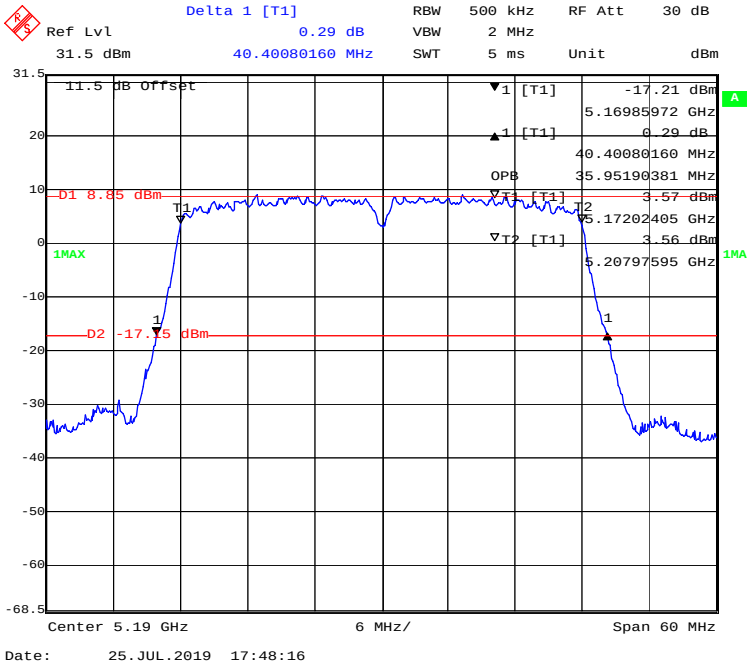
802.11ac40 mode, 5190MHz



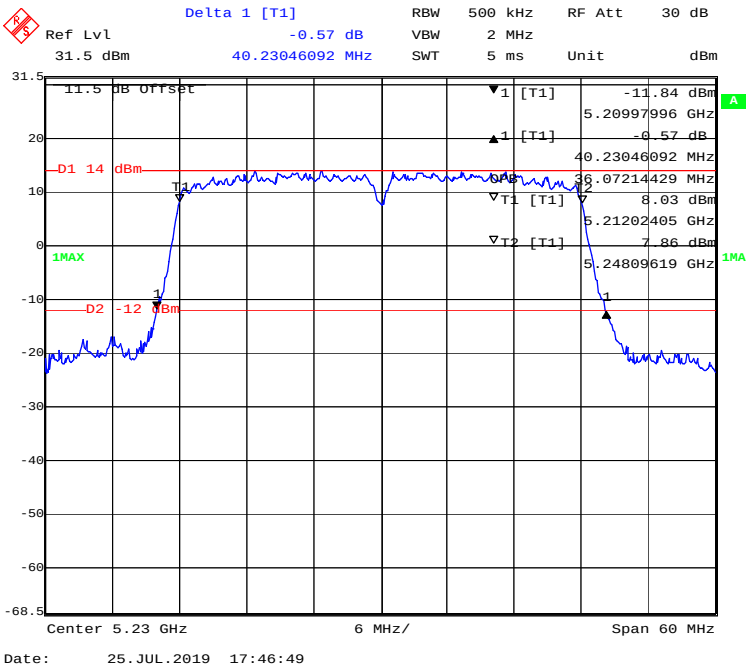
802.11 ac40 mode, 5230MHz



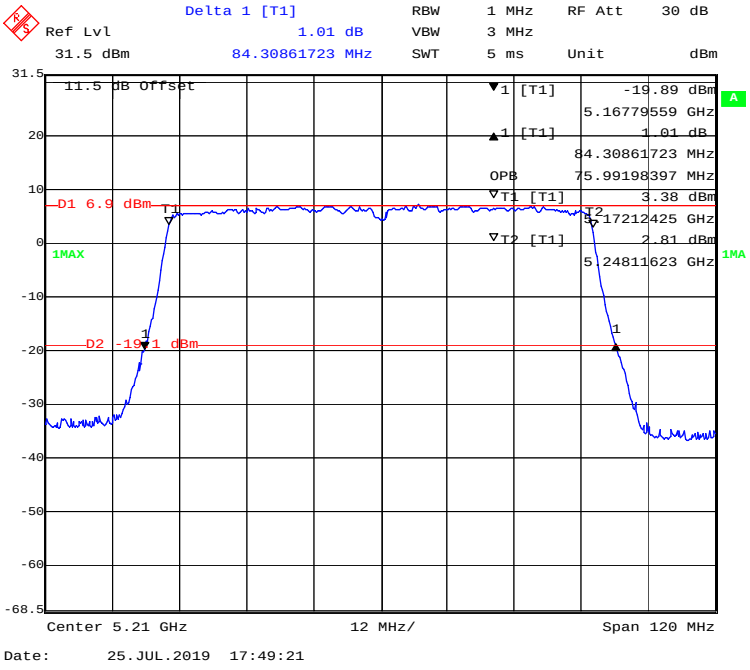
802.11n-HT40 mode, 5190MHz



802.11n-HT40 mode, 5230MHz



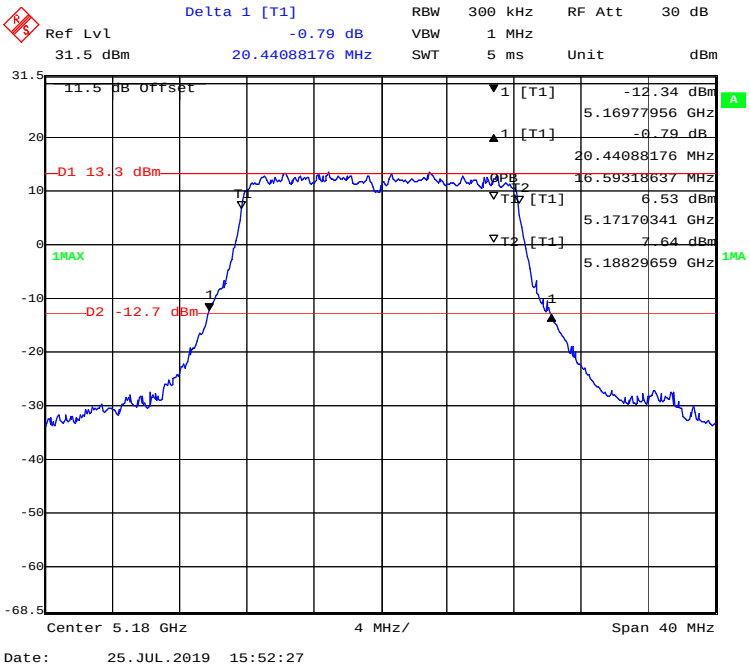
802.11ac80 mode, 5210MHz



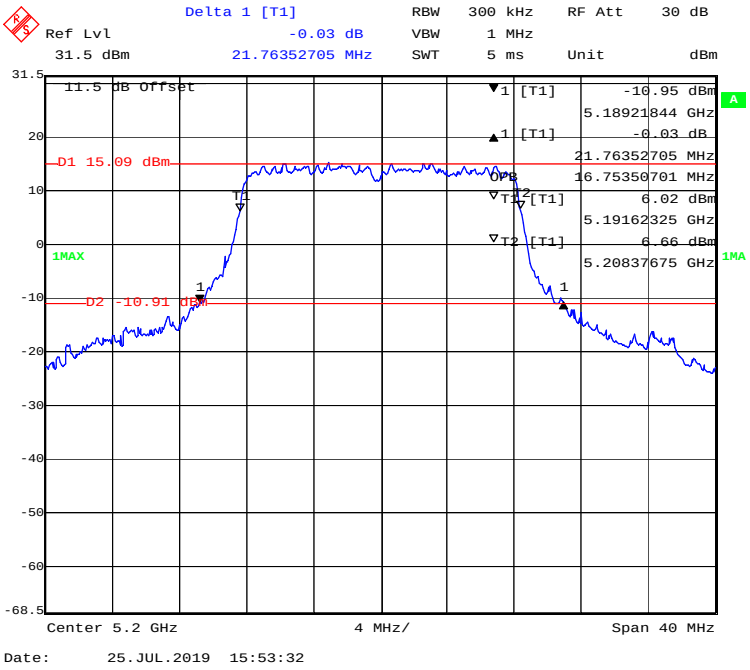
chain1:

26 Bandwidth&99% Occupied Bandwidth

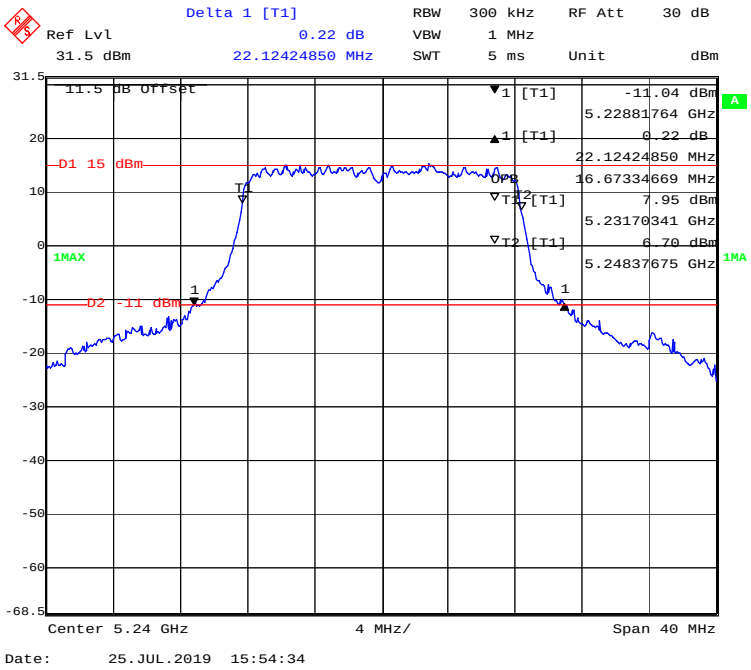
802.11a mode, 5180MHz



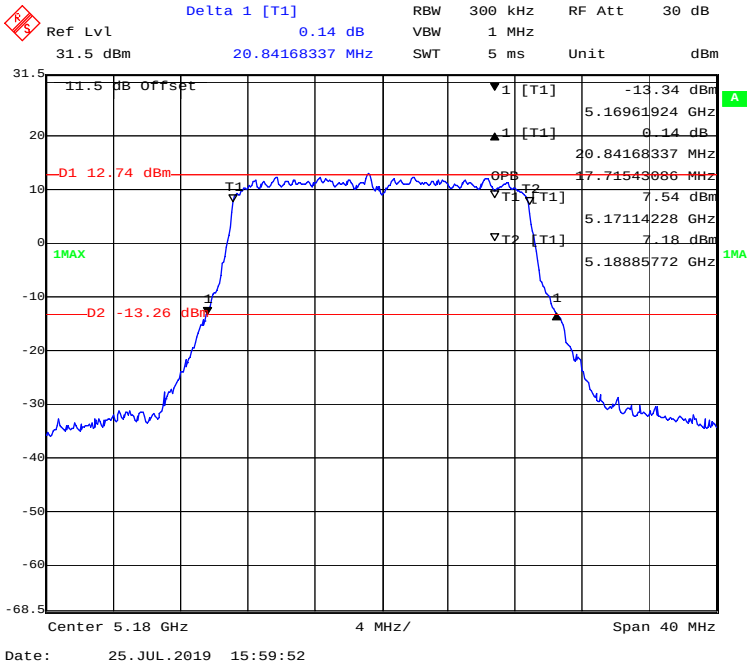
802.11a mode, 5200MHz



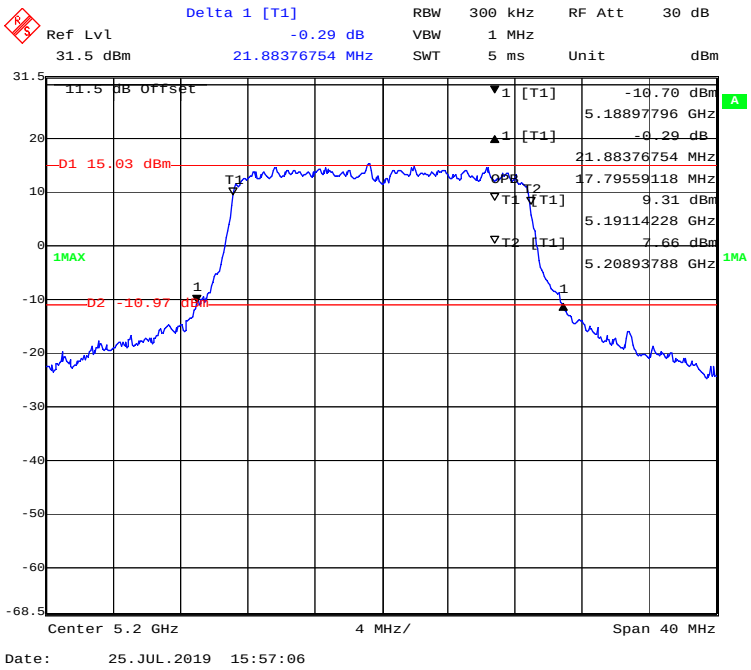
802.11a mode, 5240MHz



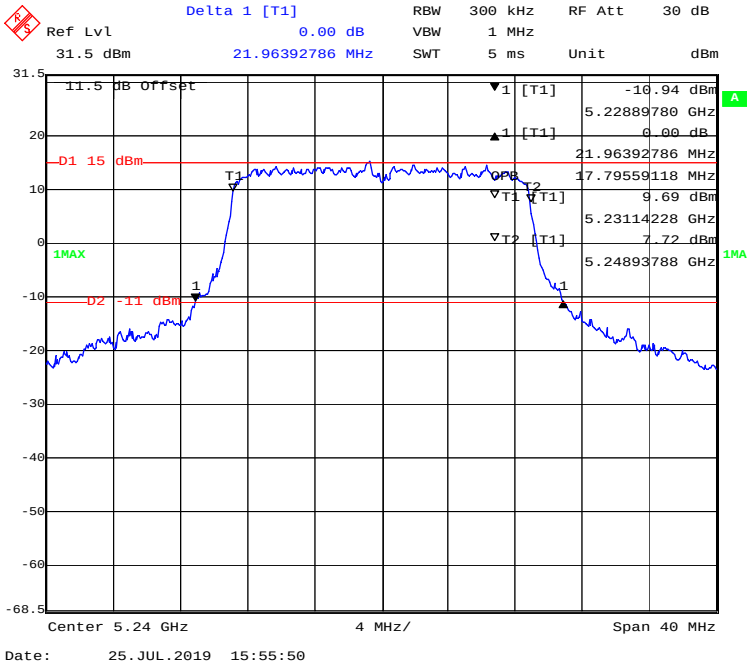
802.11ac20 mode, 5180MHz



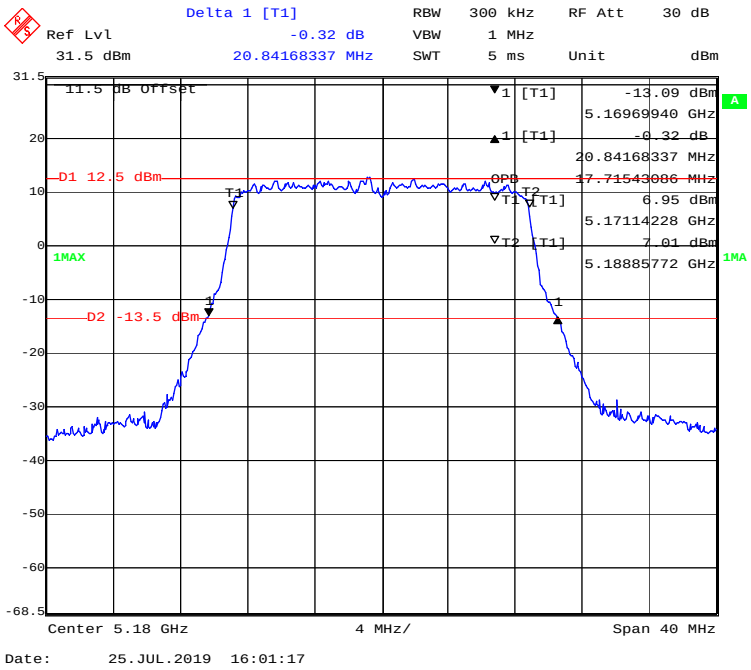
802.11 ac20 mode, 5200MHz



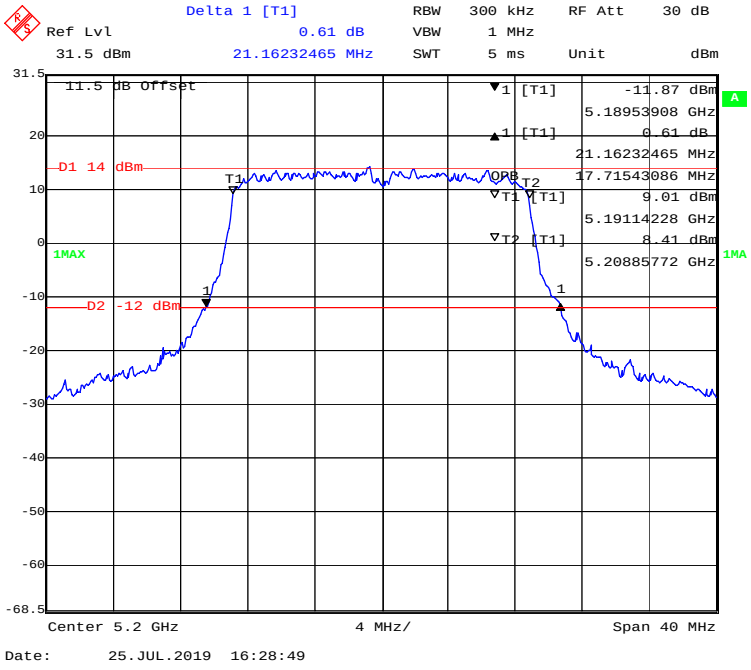
802.11 ac20 mode, 5240MHz



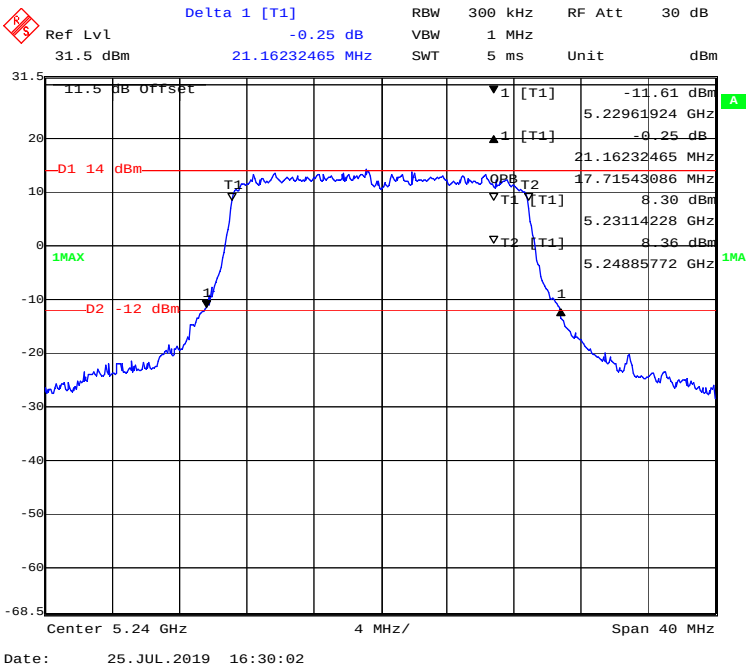
802.11n-HT20 mode, 5180MHz



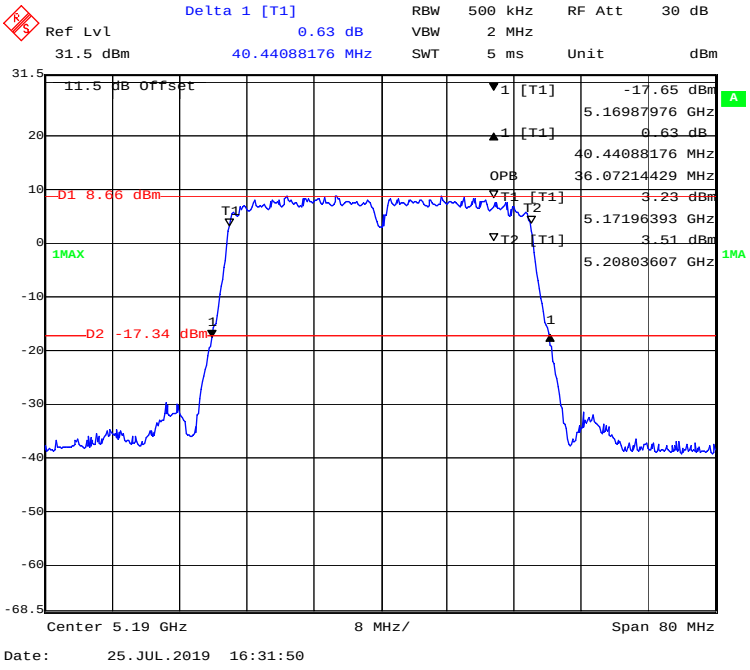
802.11n-HT20 mode, 5200MHz



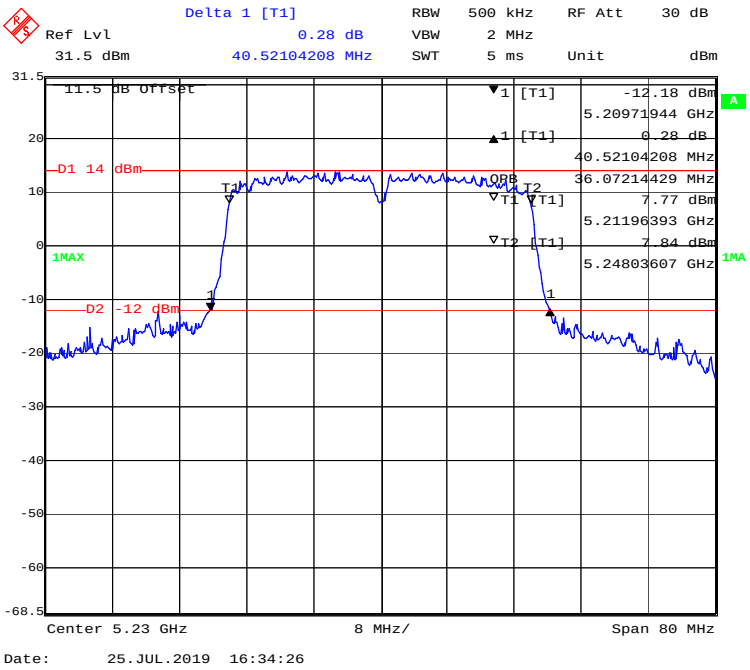
802.11n-HT20 mode, 5240MHz



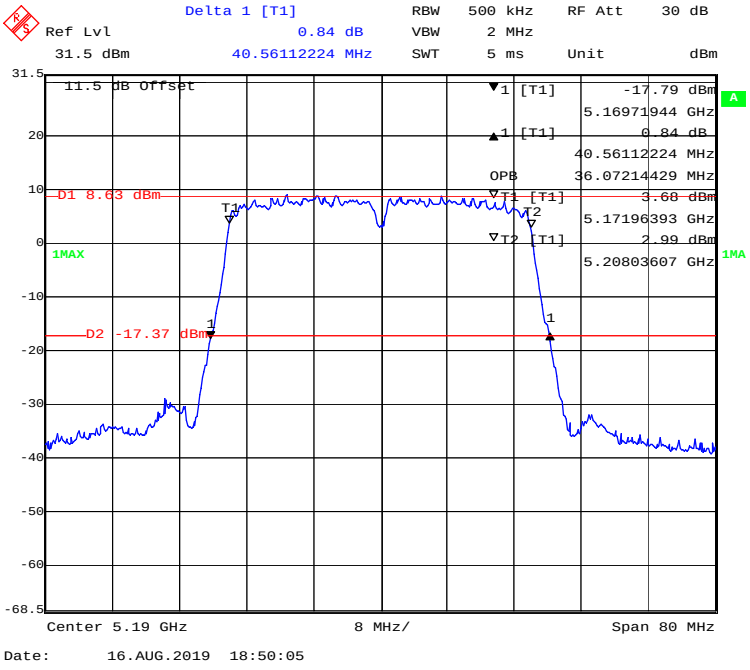
802.11ac40 mode, 5190MHz



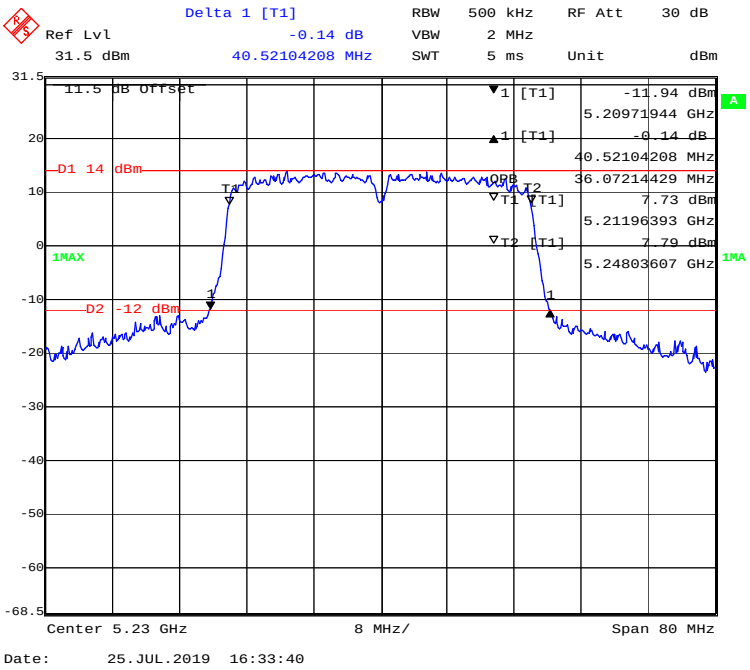
802.11 ac40 mode, 5230MHz



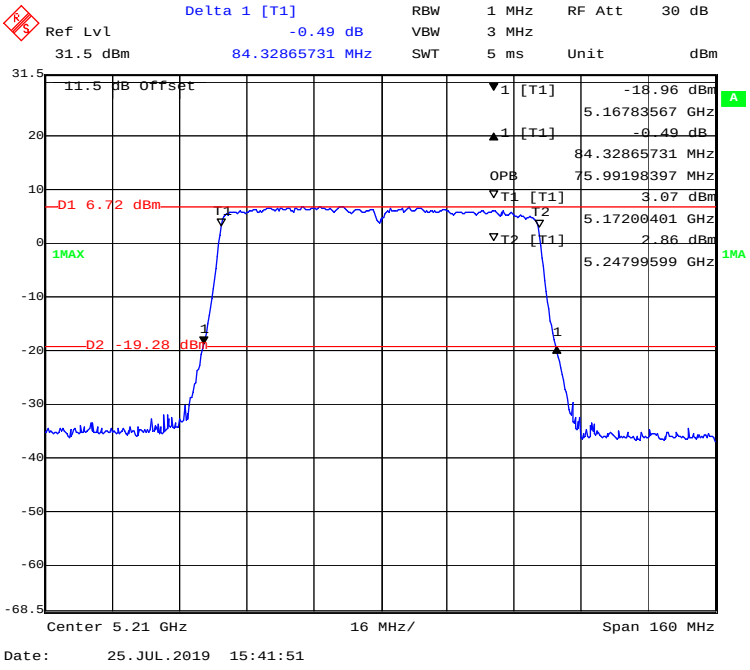
802.11n-HT40 mode, 5190MHz



802.11n-HT40 mode, 5230MHz

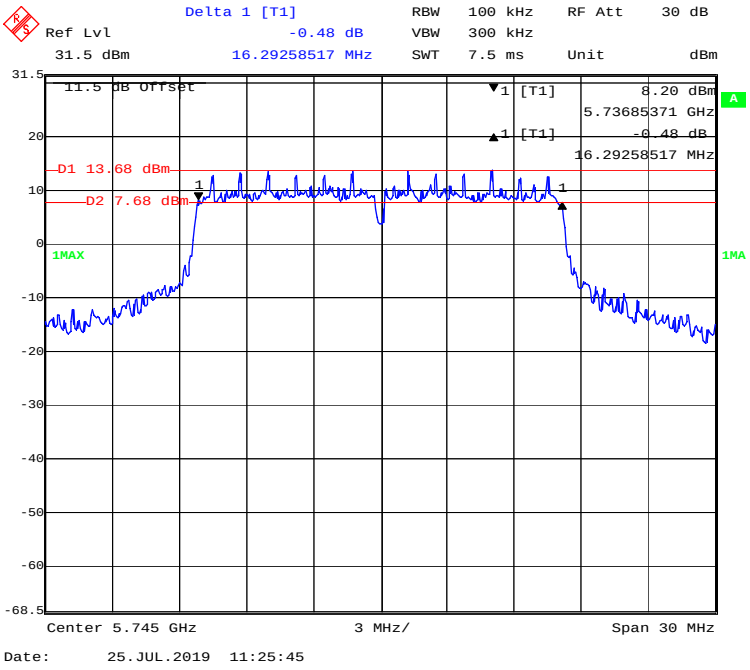


802.11ac80 mode, 5210MHz

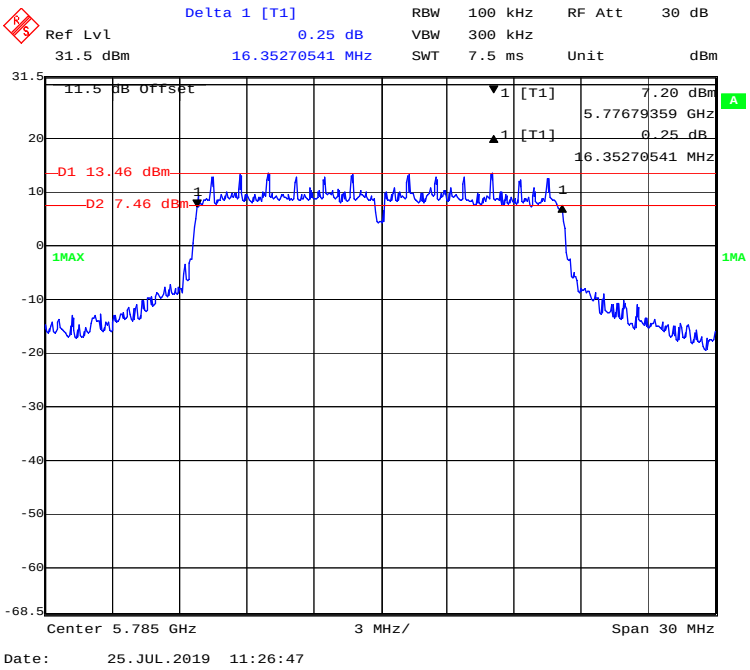


5725-5850 MHz Band
chain0:
6 Bandwidth

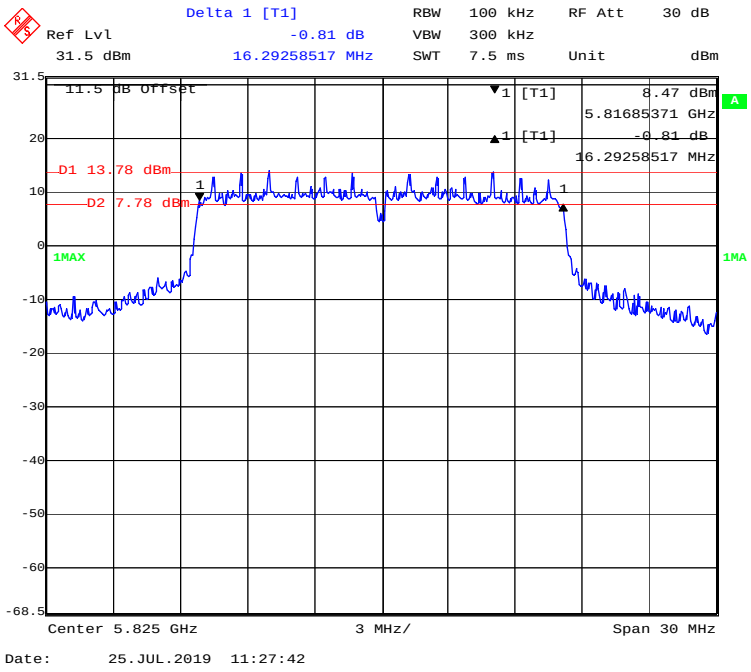
802.11a mode, 5745MHz



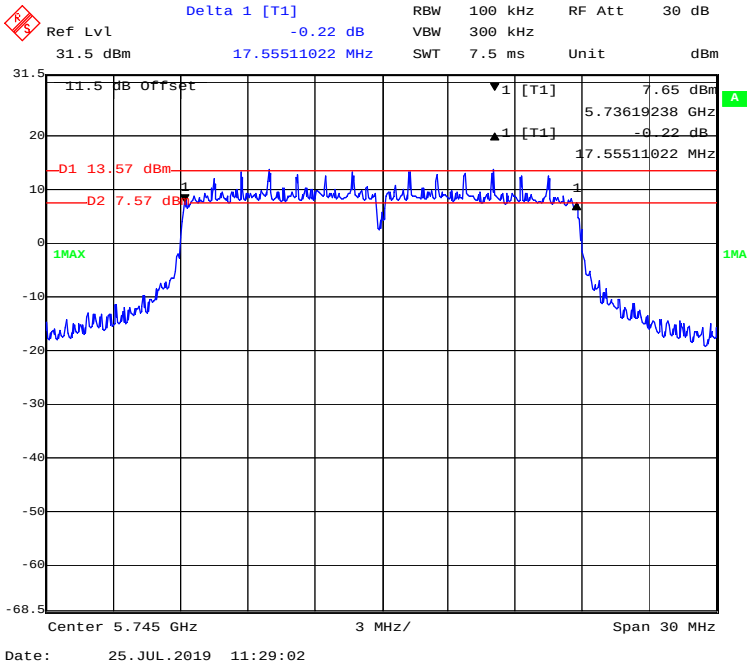
802.11a mode, 5785MHz



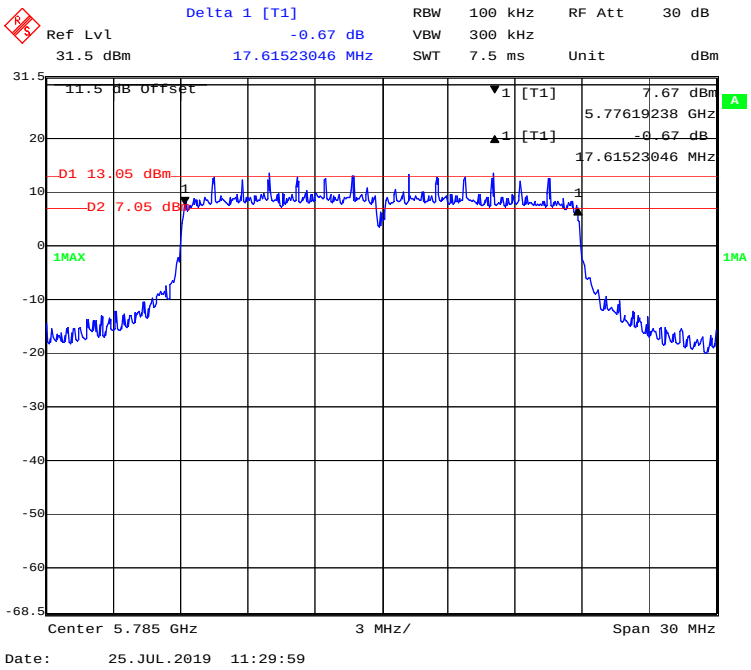
802.11a mode, 5825MHz



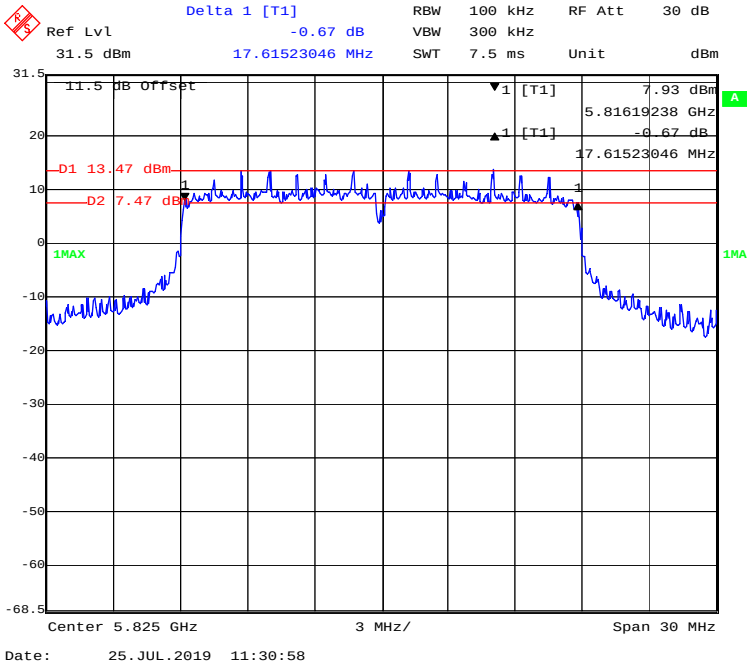
802.11ac20 mode, 5745MHz



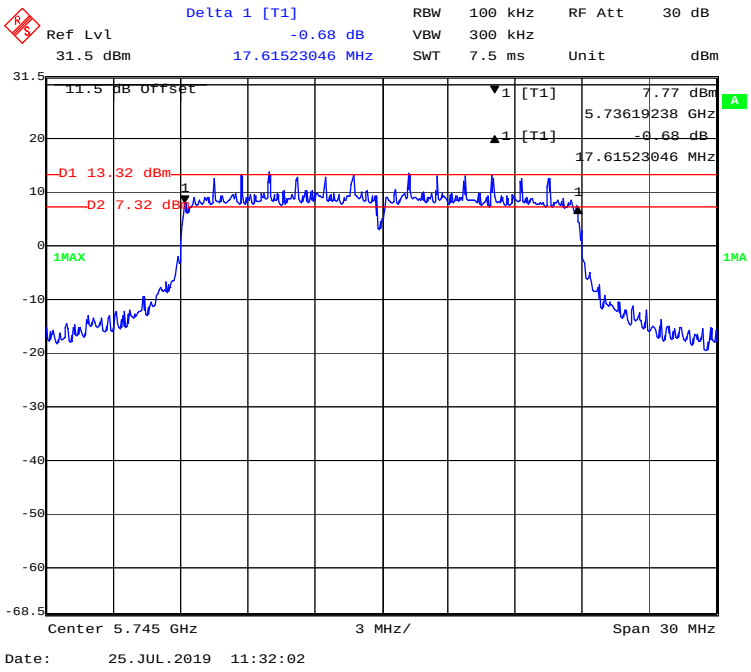
802.11 ac20 mode, 5785MHz



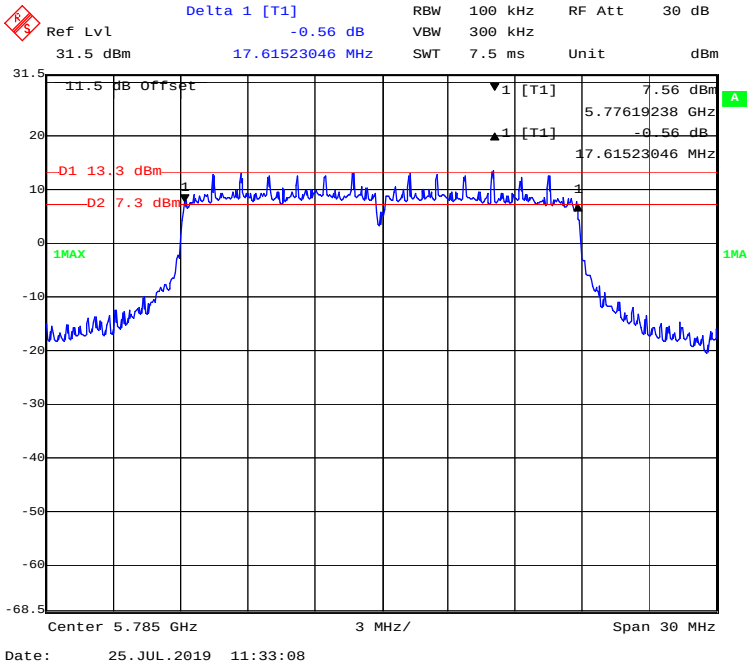
802.11 ac20 mode, 5825MHz



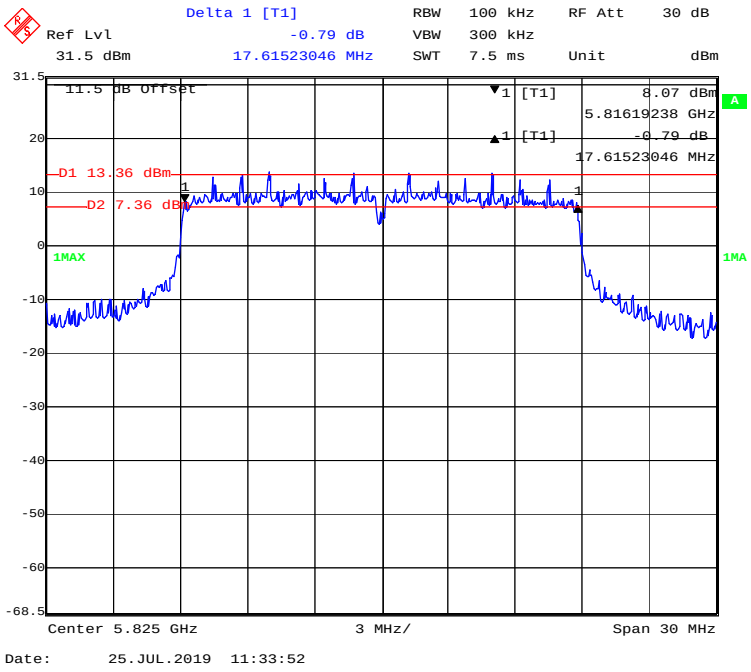
802.11n-HT20 mode, 5745MHz



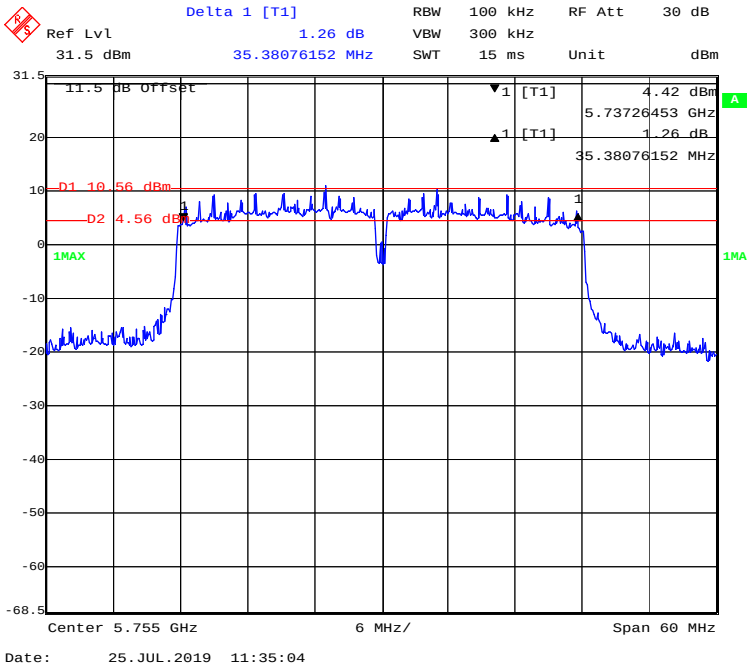
802.11n-HT20 mode, 5785MHz



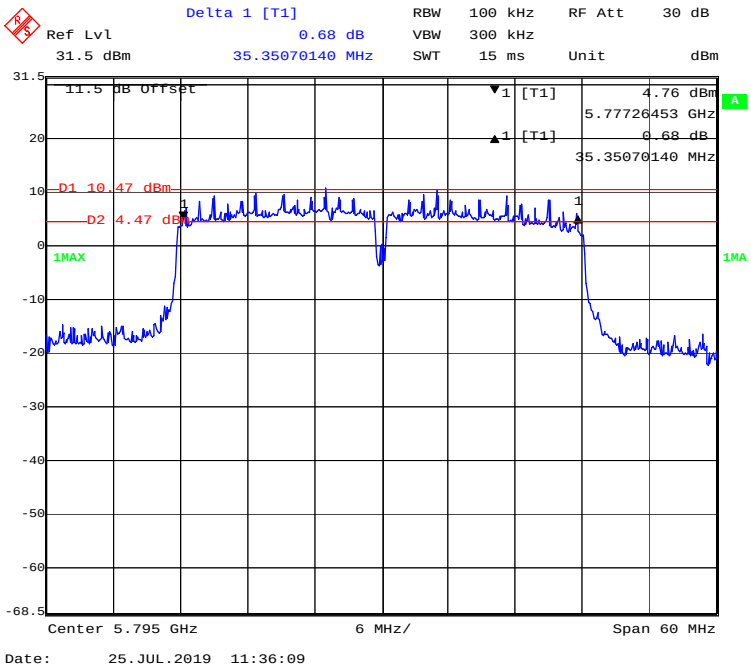
802.11n-HT20 mode, 5825MHz



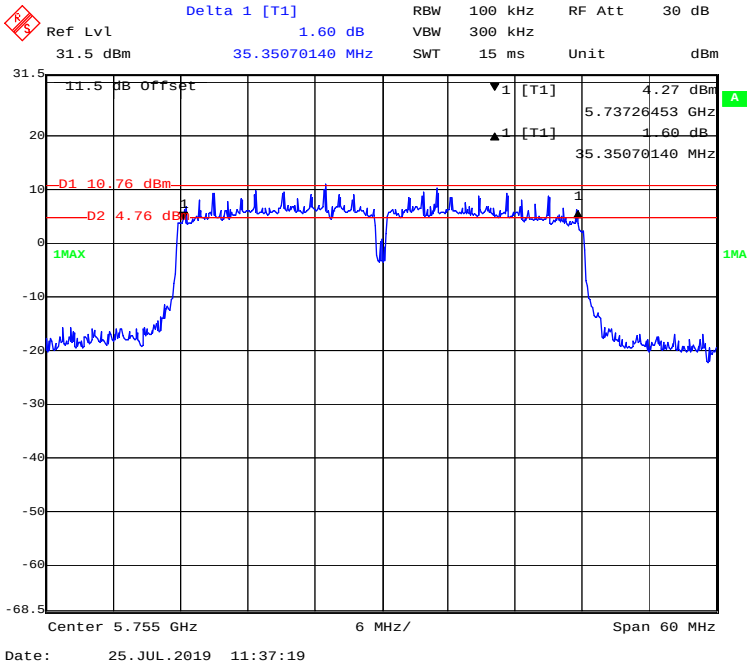
802.11ac40 mode, 5755MHz



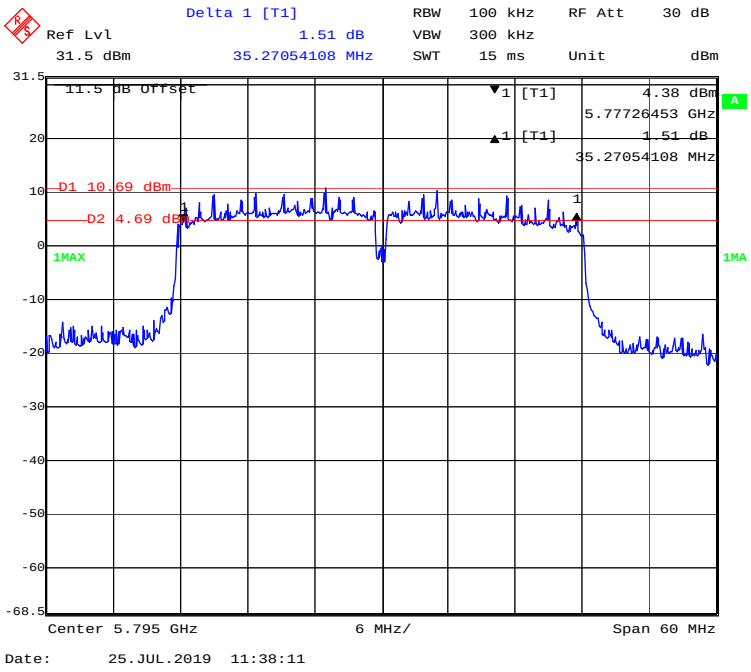
802.11 ac40 mode, 5795MHz



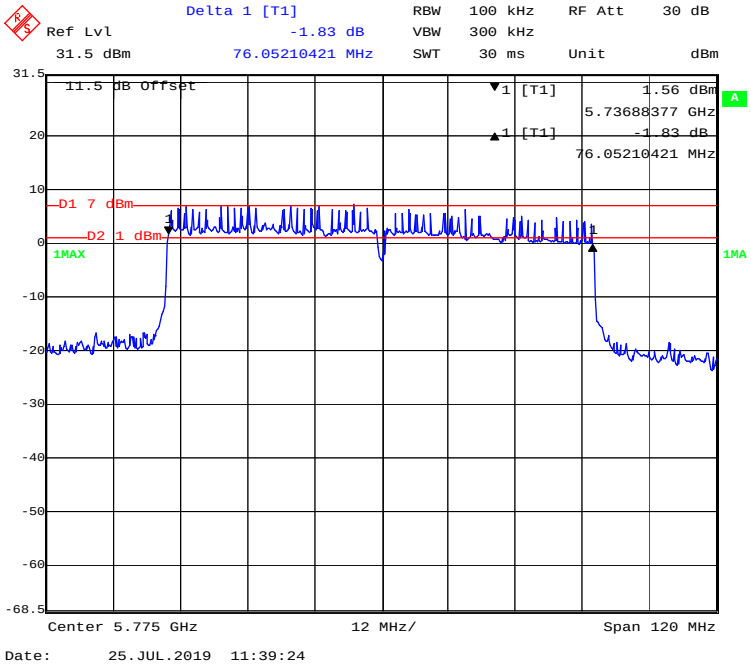
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz



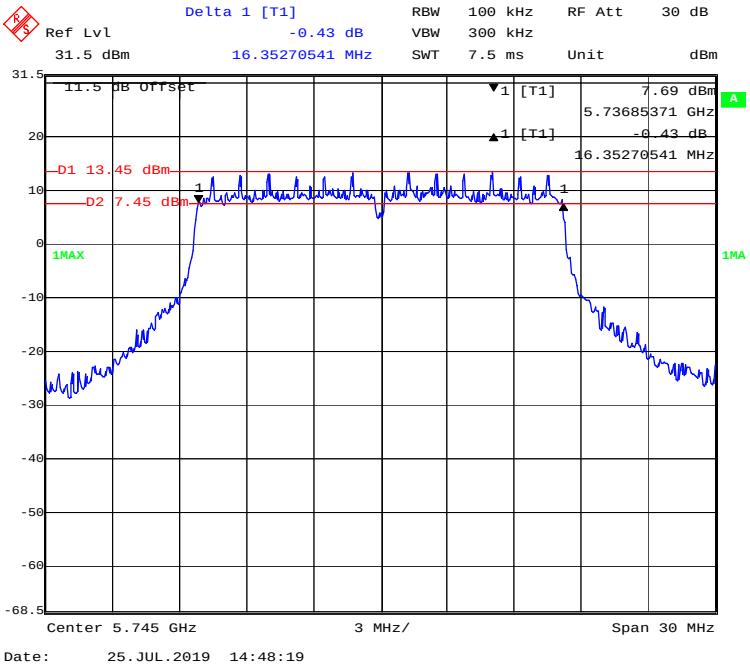
802.11ac80 mode, 5775MHz



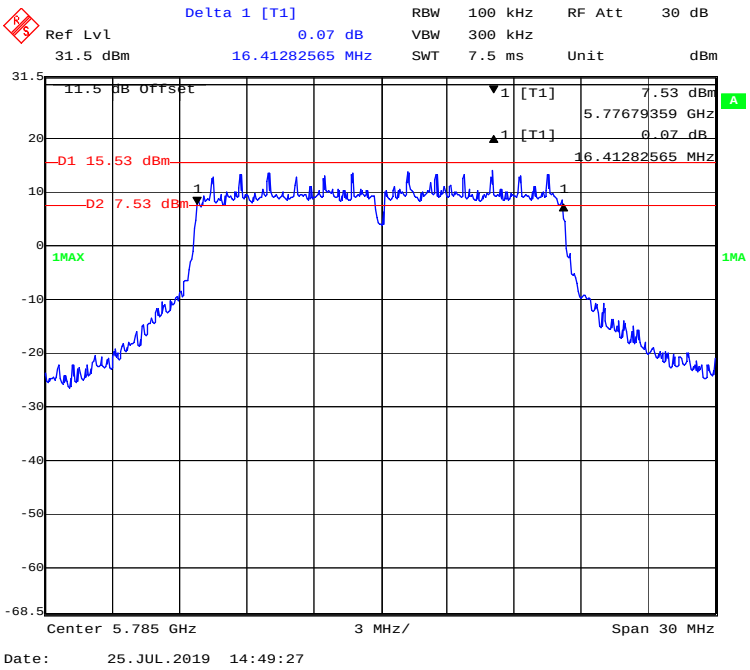
chain1:

6 Bandwidth

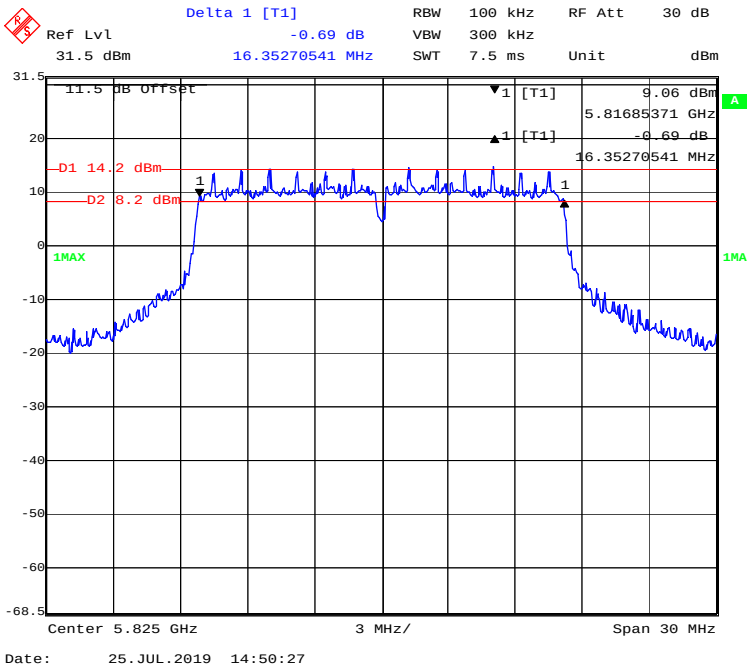
802.11a mode, 5745MHz



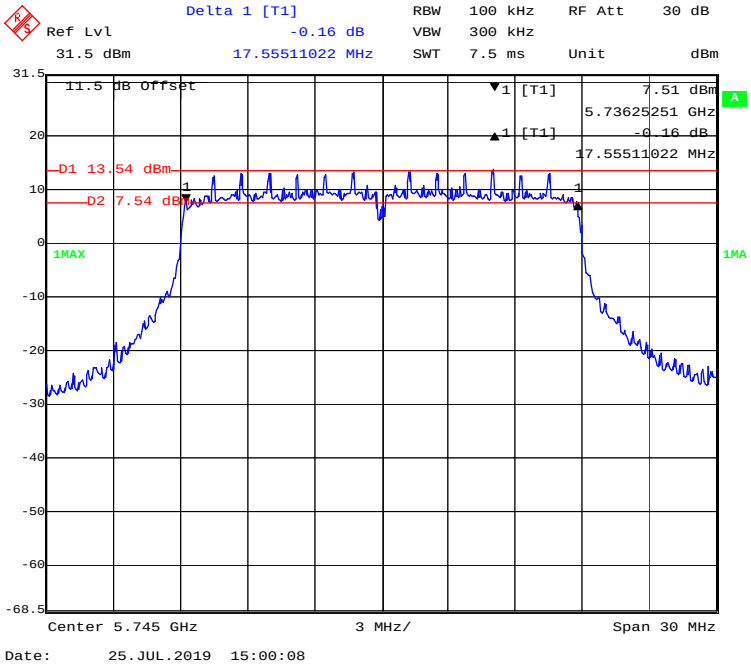
802.11a mode, 5785MHz



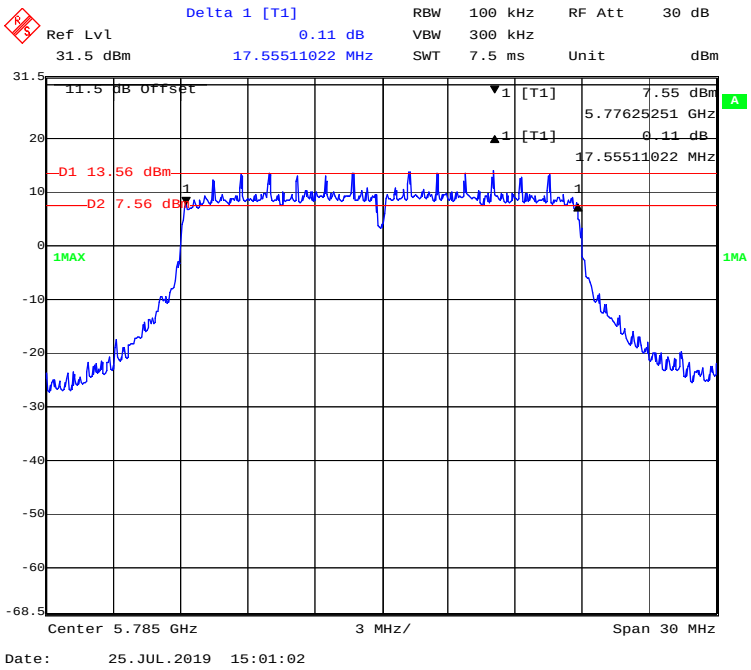
802.11a mode, 5825MHz



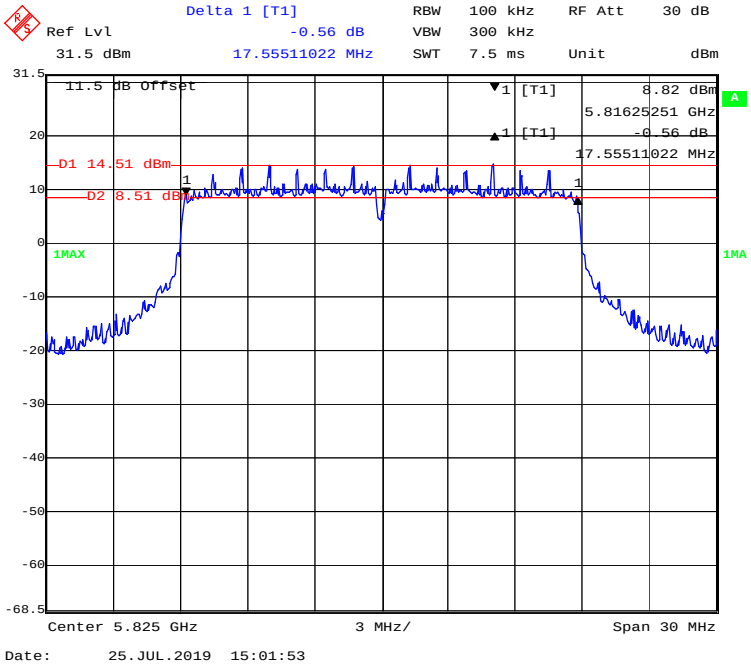
802.11ac20 mode, 5745MHz



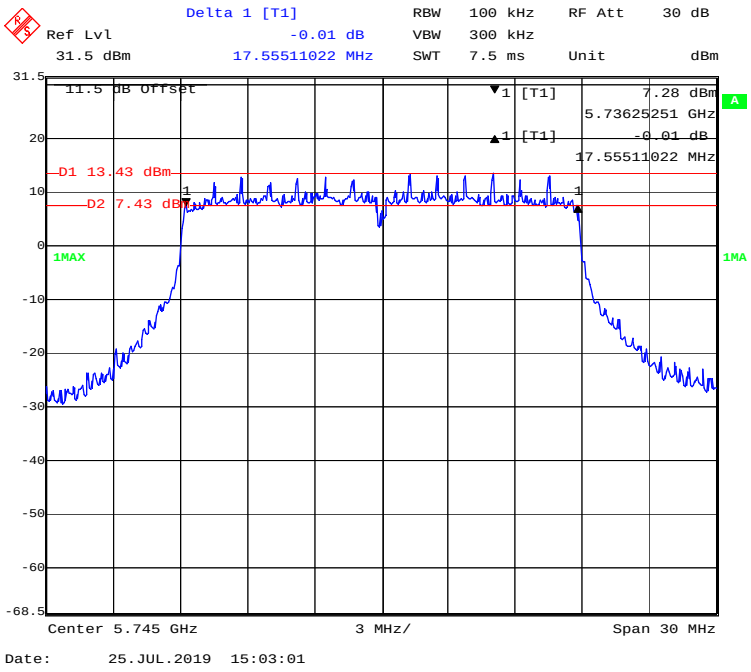
802.11 ac20 mode, 5785MHz



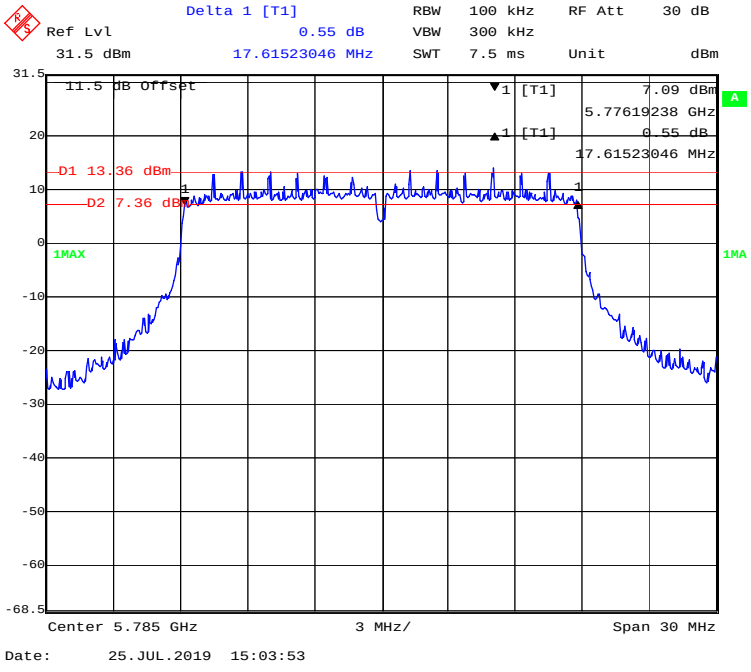
802.11 ac20 mode, 5825MHz



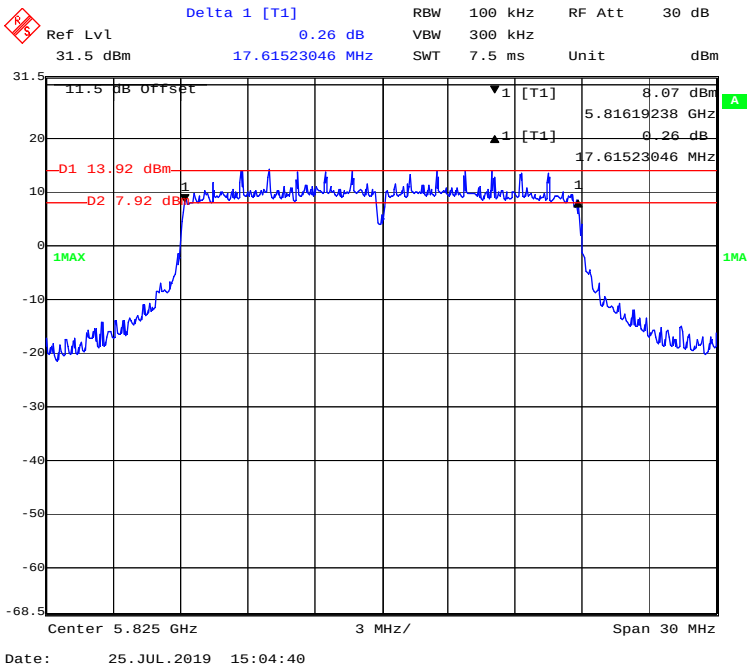
802.11n-HT20 mode, 5745MHz



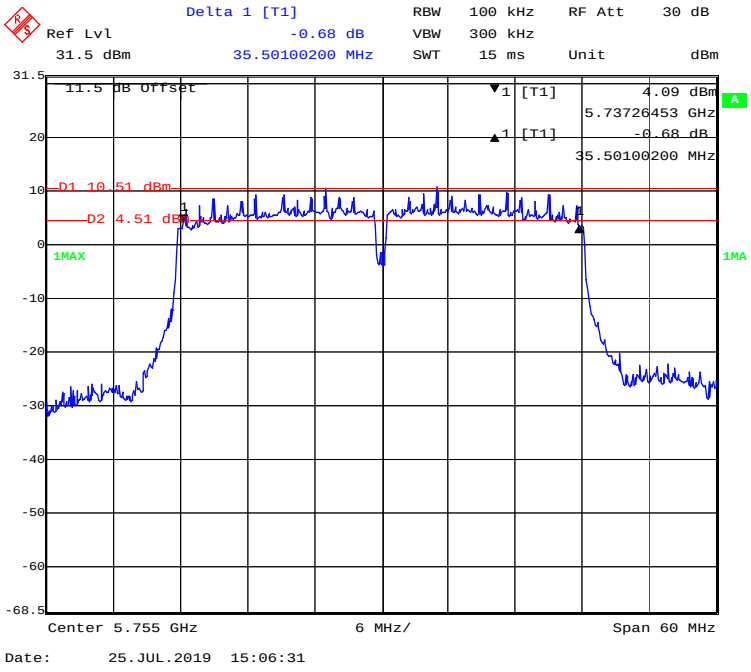
802.11n-HT20 mode, 5785MHz



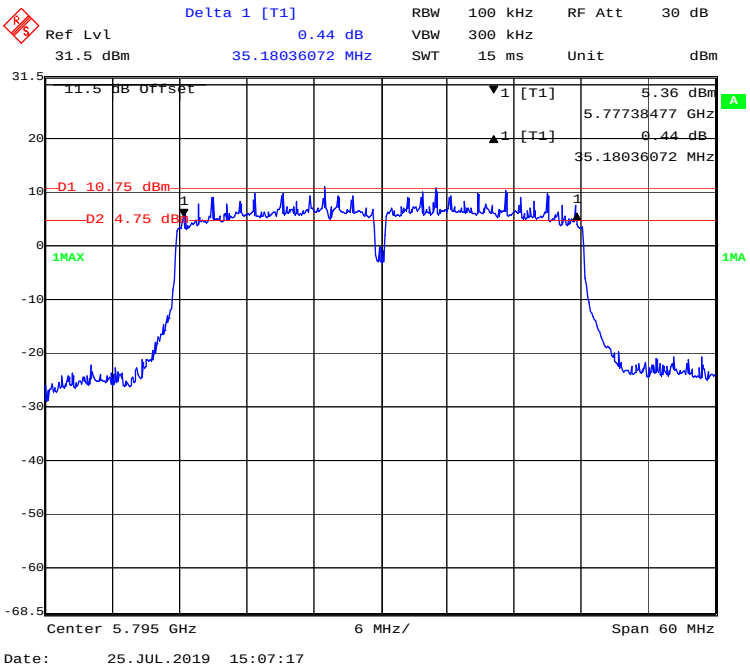
802.11n-HT20 mode, 5825MHz



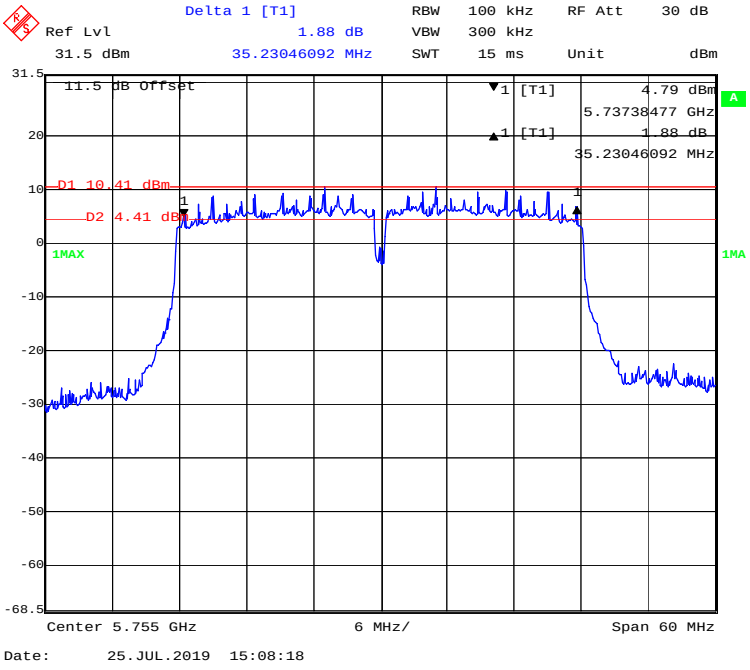
802.11ac40 mode, 5755MHz



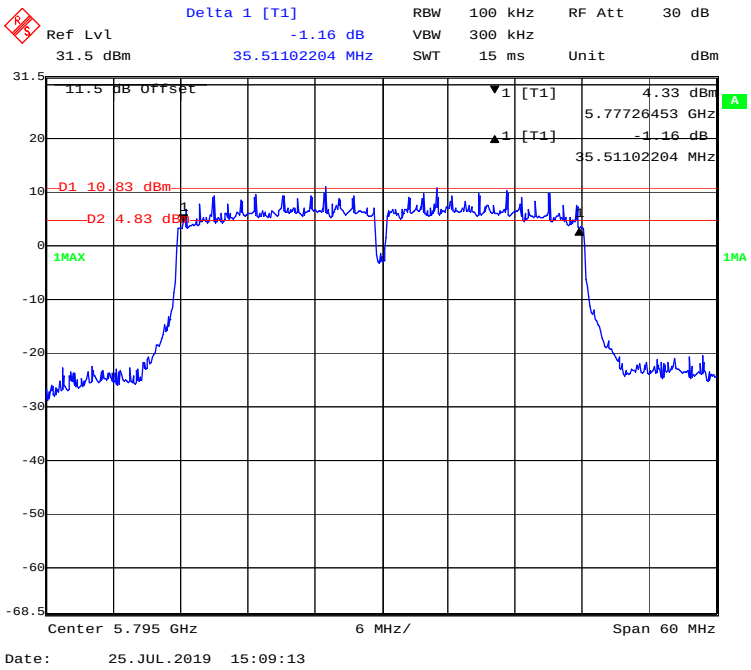
802.11 ac40 mode, 5795MHz



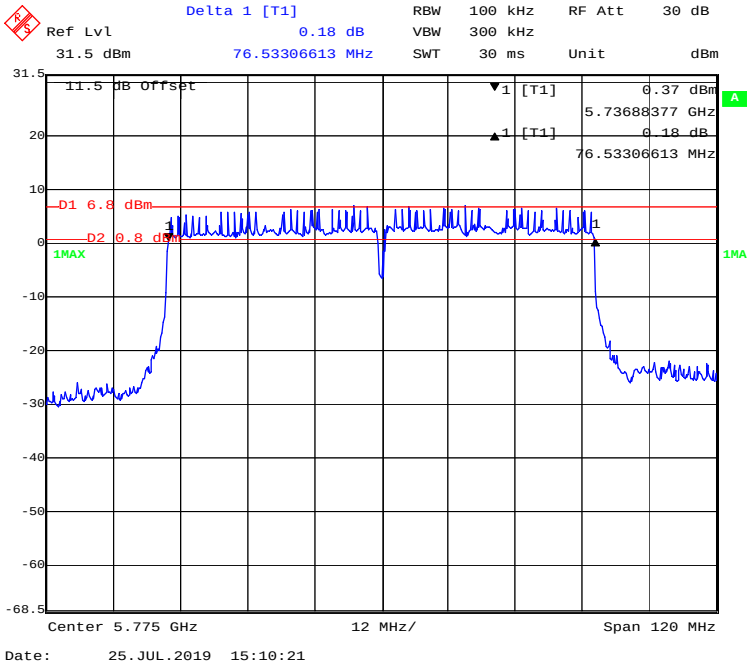
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz

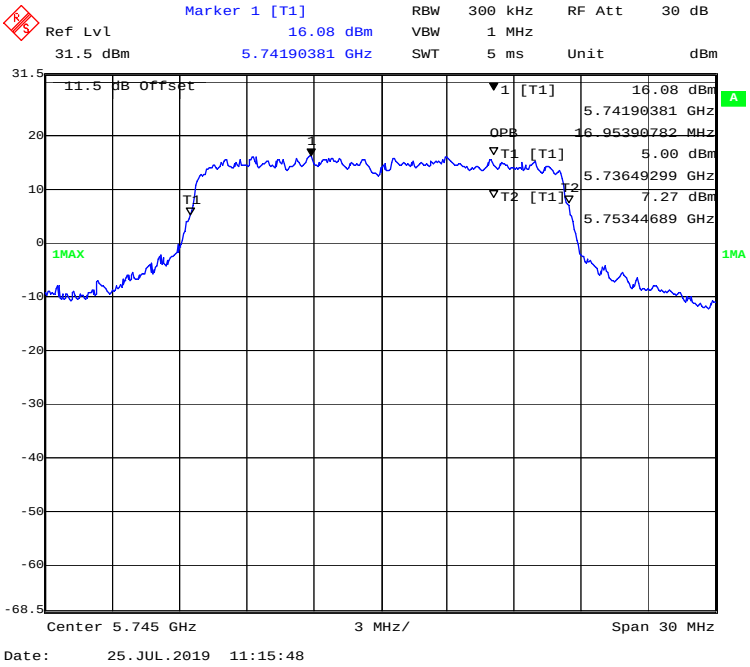


802.11ac80 mode, 5775MHz

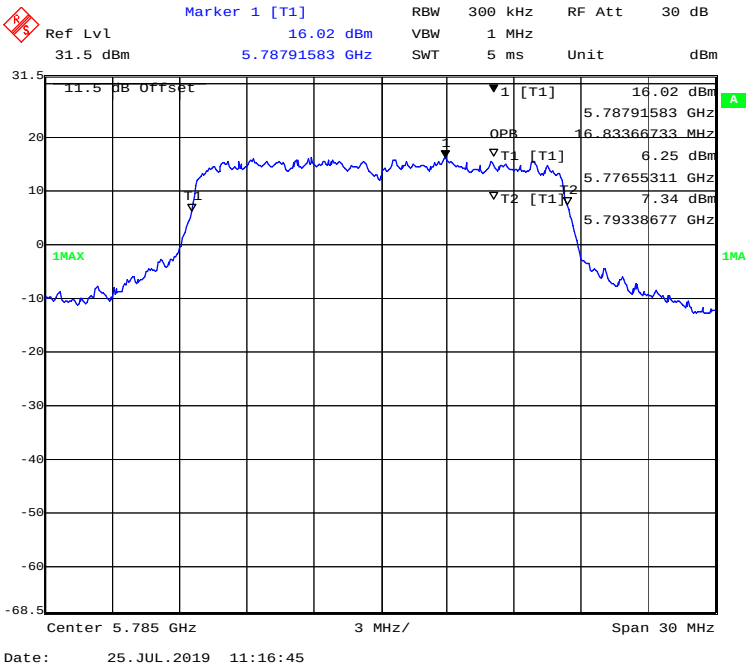


99% Occupied Bandwidth-chain0

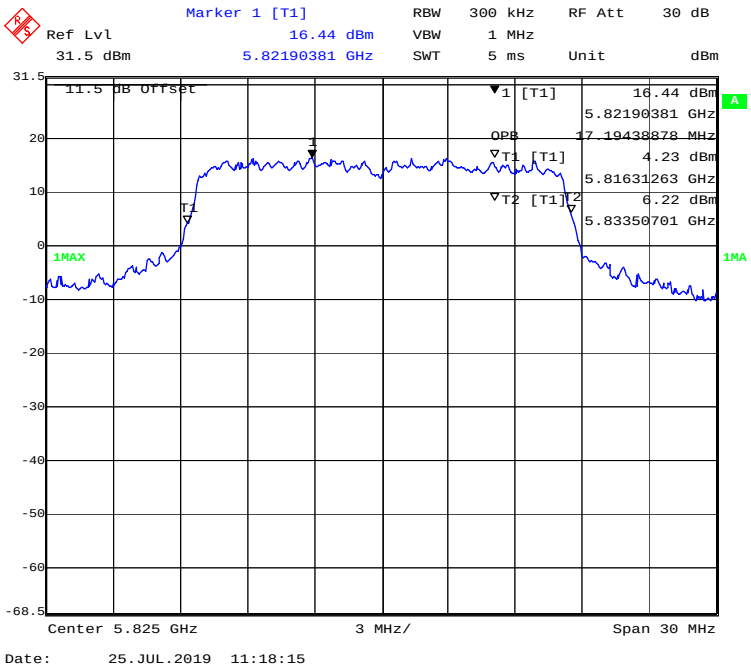
802.11a mode, 5745MHz



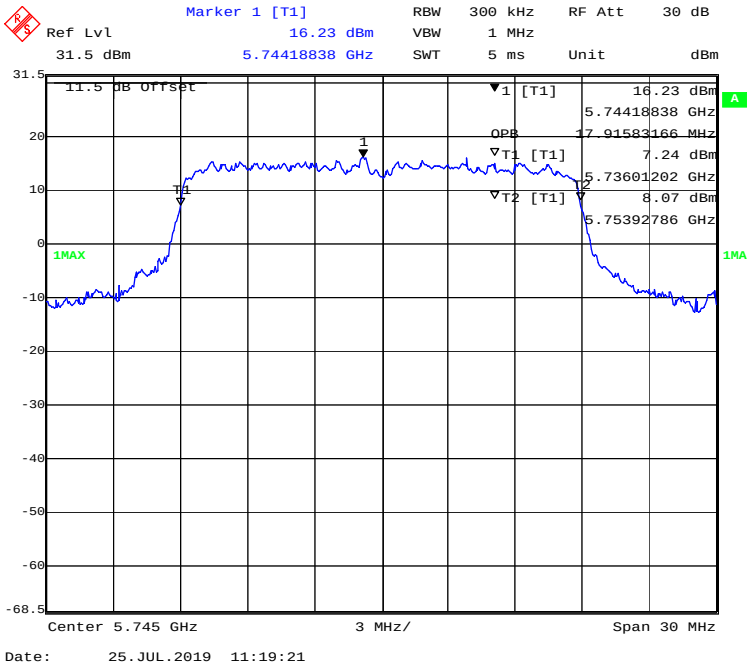
802.11a mode, 5785MHz



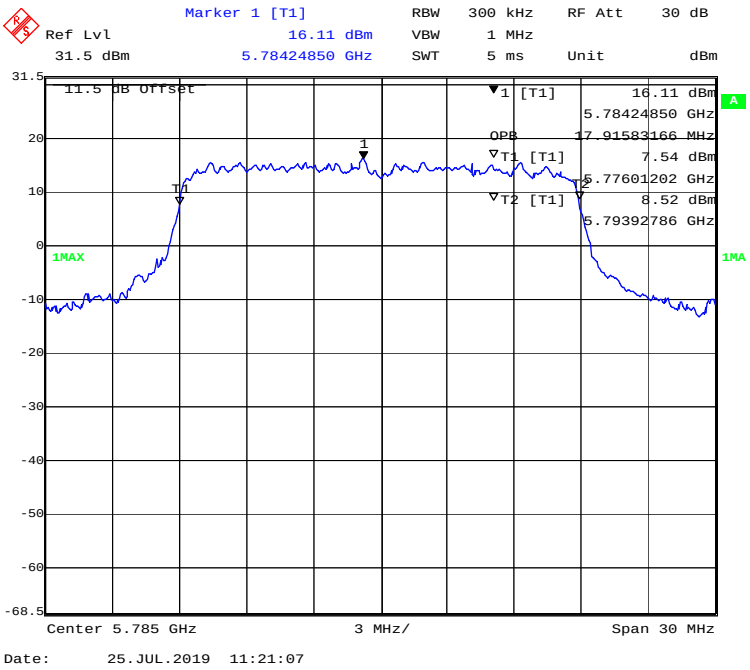
802.11a mode, 5825MHz



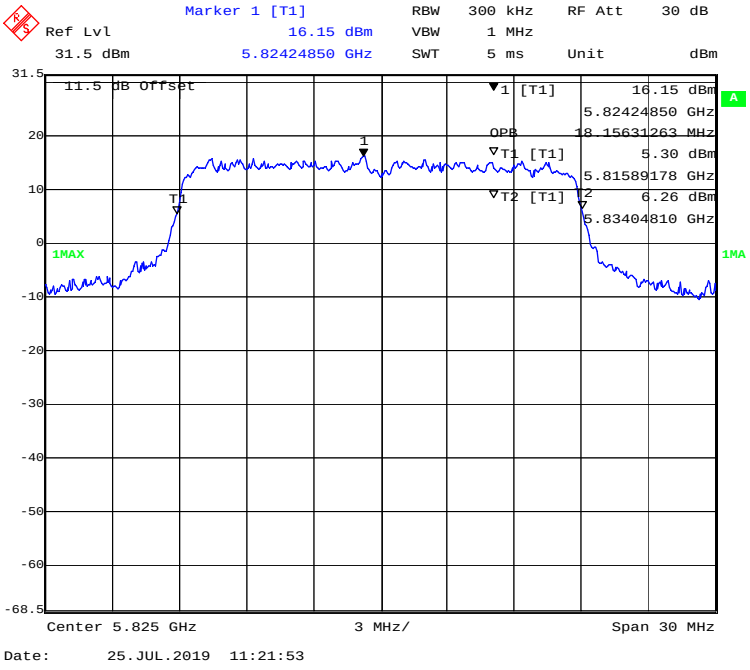
802.11ac20 mode, 5745MHz



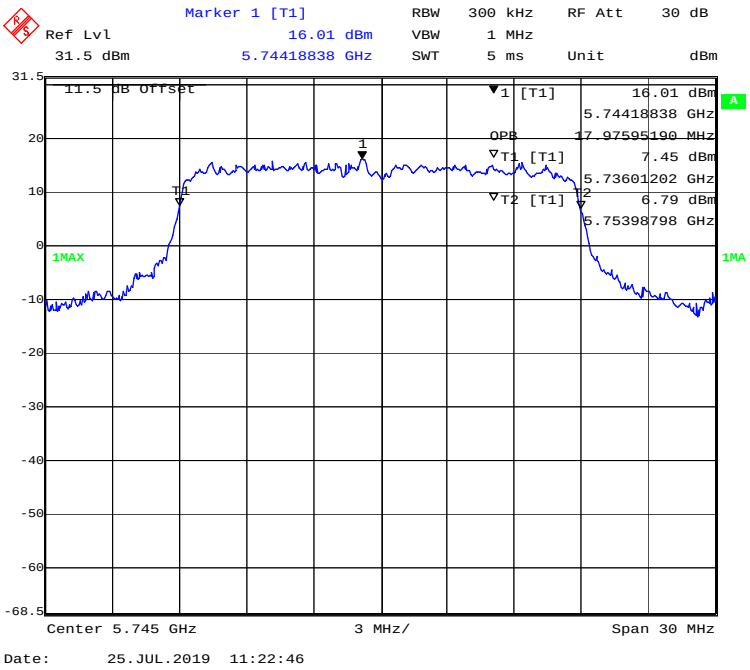
802.11 ac20 mode, 5785MHz



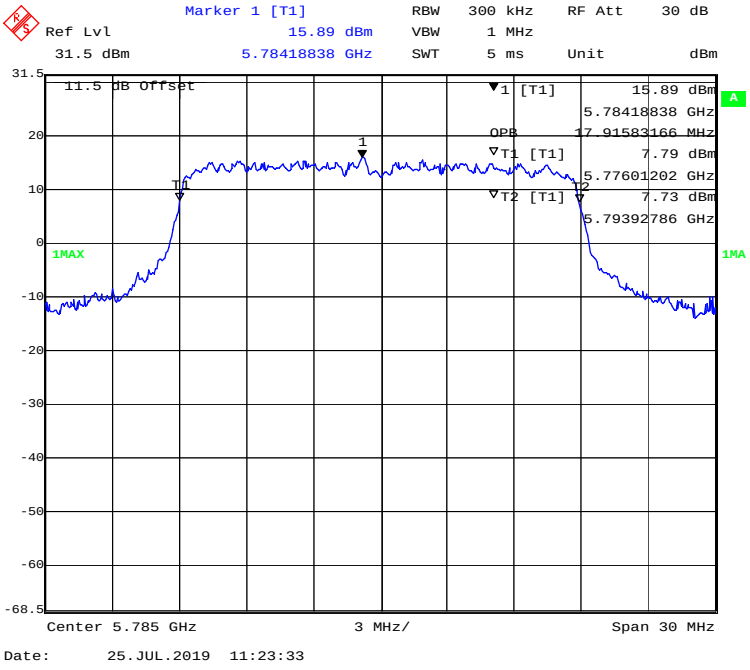
802.11 ac20 mode, 5825MHz



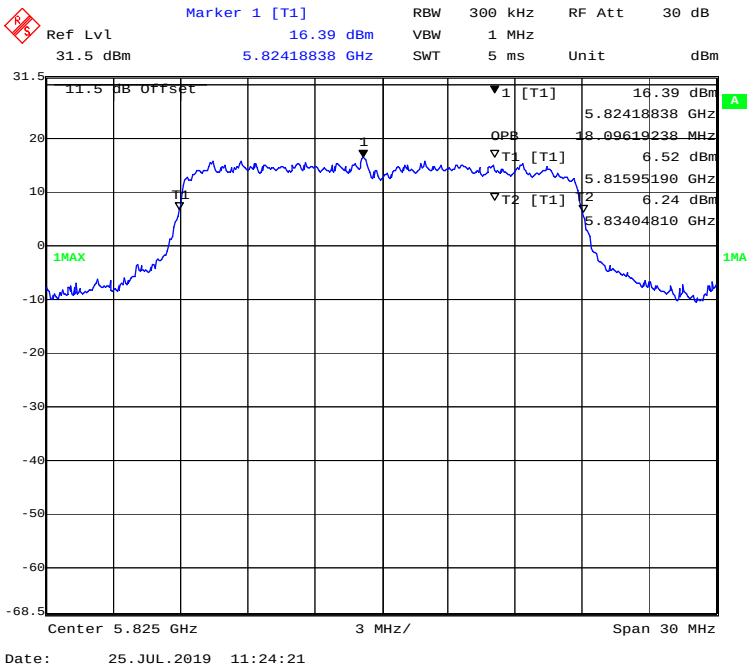
802.11n-HT20 mode, 5745MHz



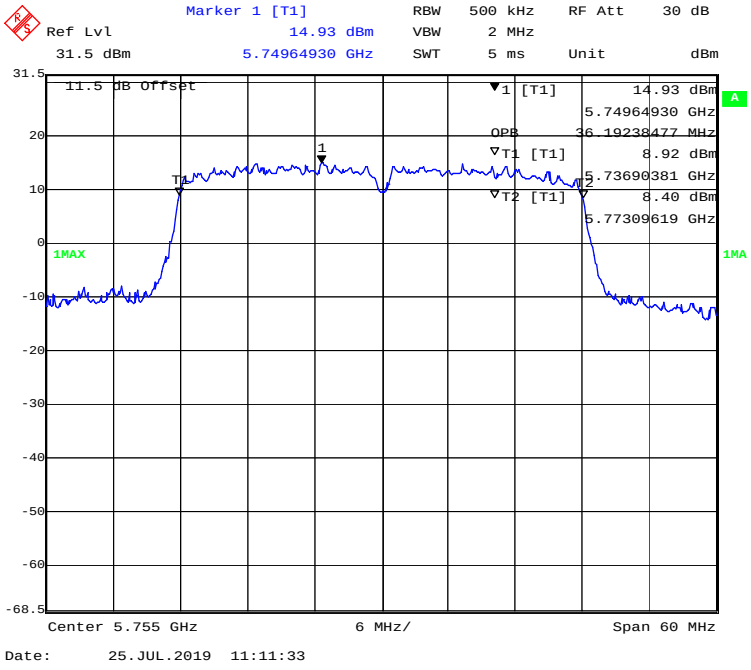
802.11n-HT20 mode, 5785MHz



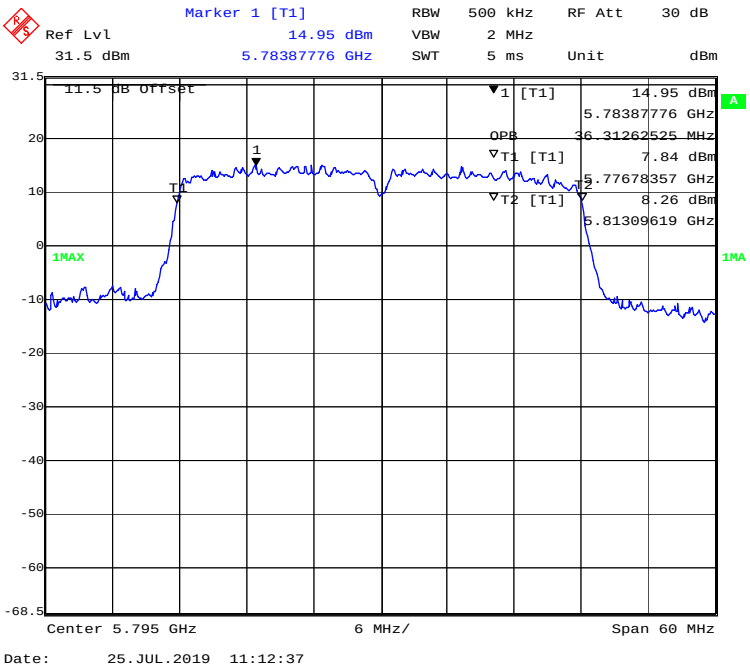
802.11n-HT20 mode, 5825MHz



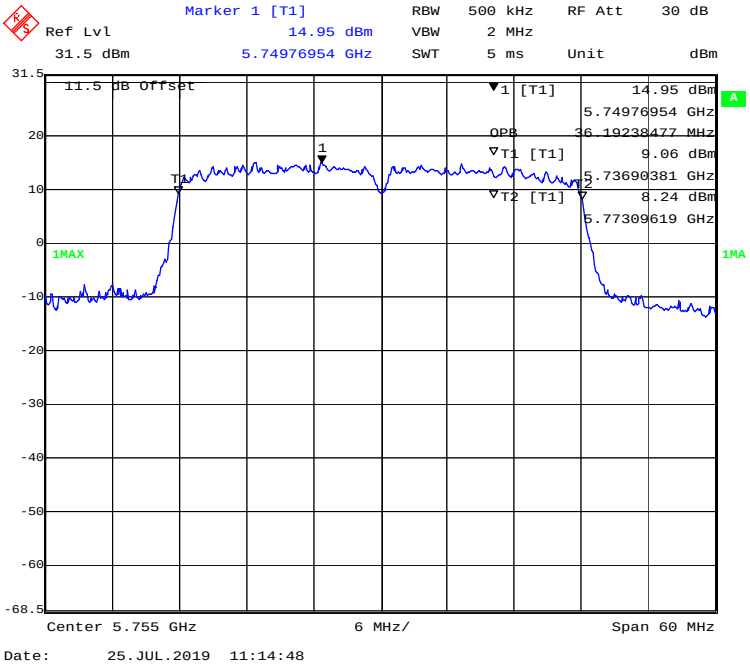
802.11ac40 mode, 5755MHz



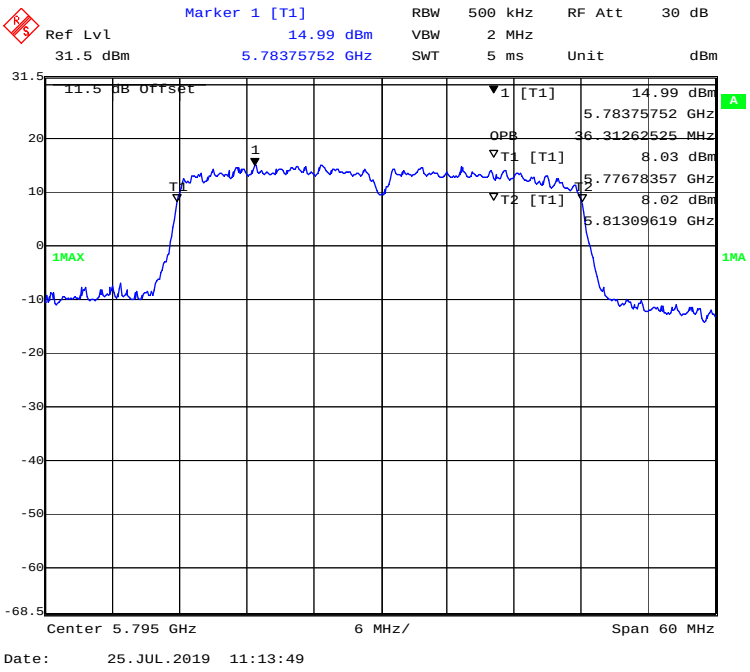
802.11 ac40 mode, 5795MHz



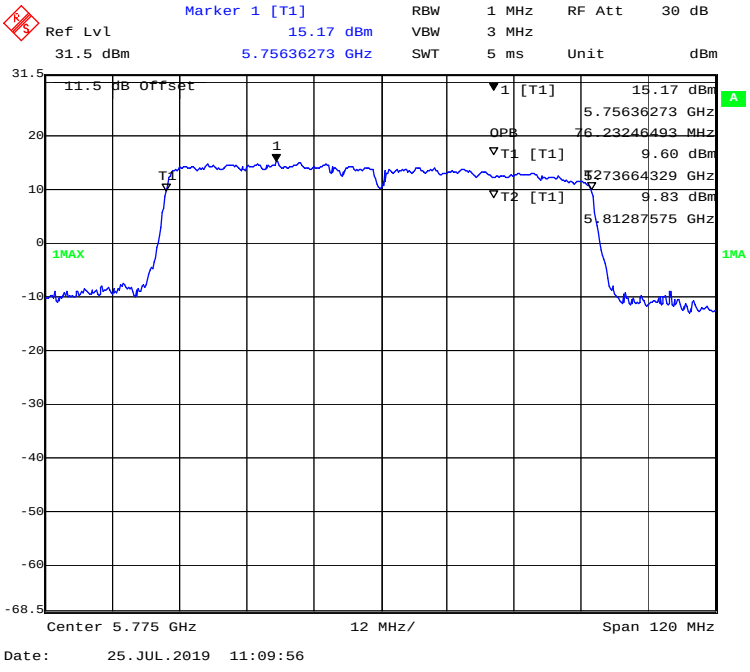
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz

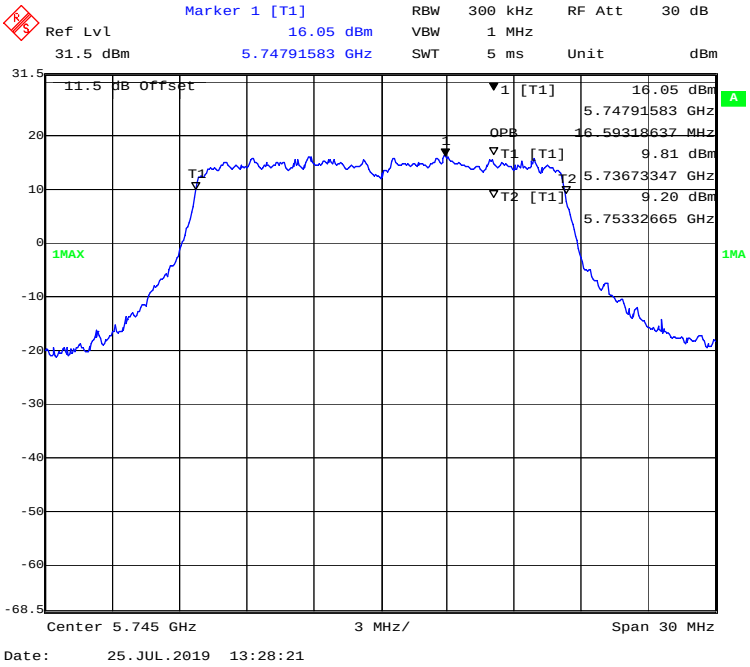


802.11n-ac80 mode, 5775MHz

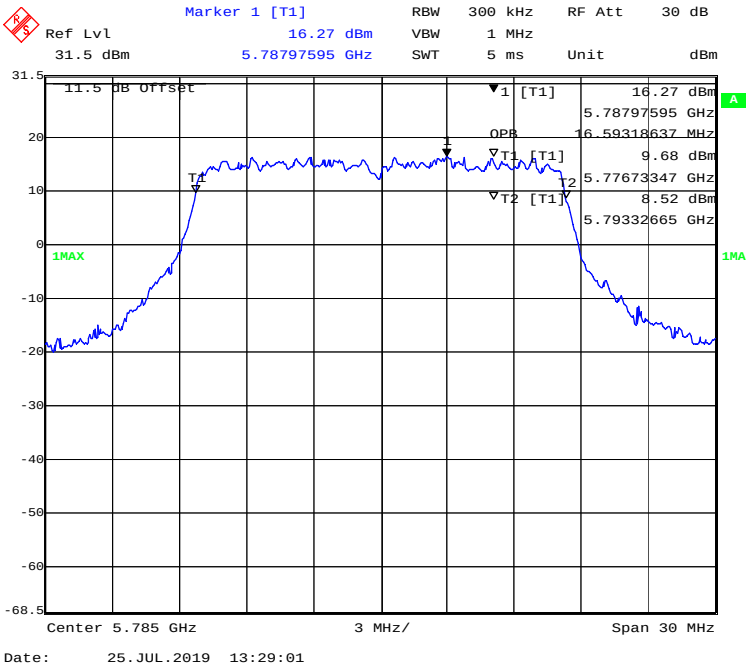


99% Occupied Bandwidth-chain1

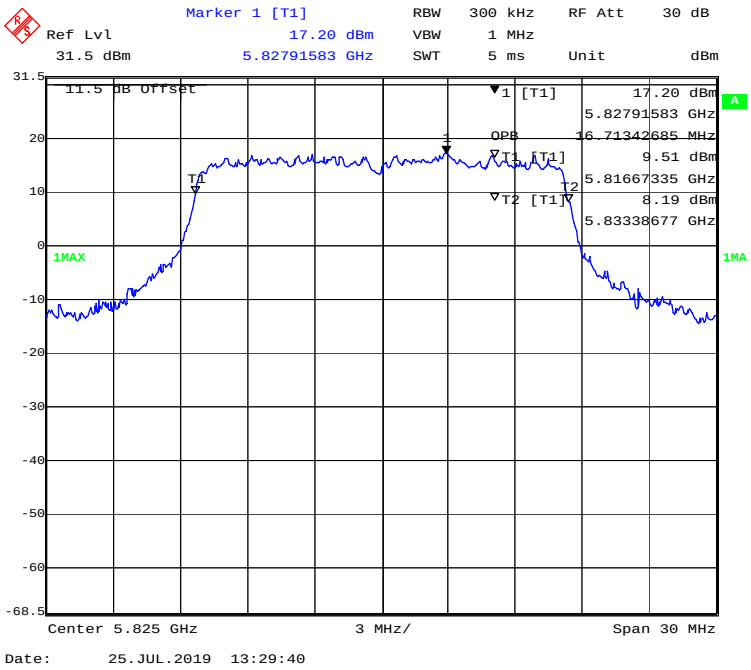
802.11a mode, 5745MHz



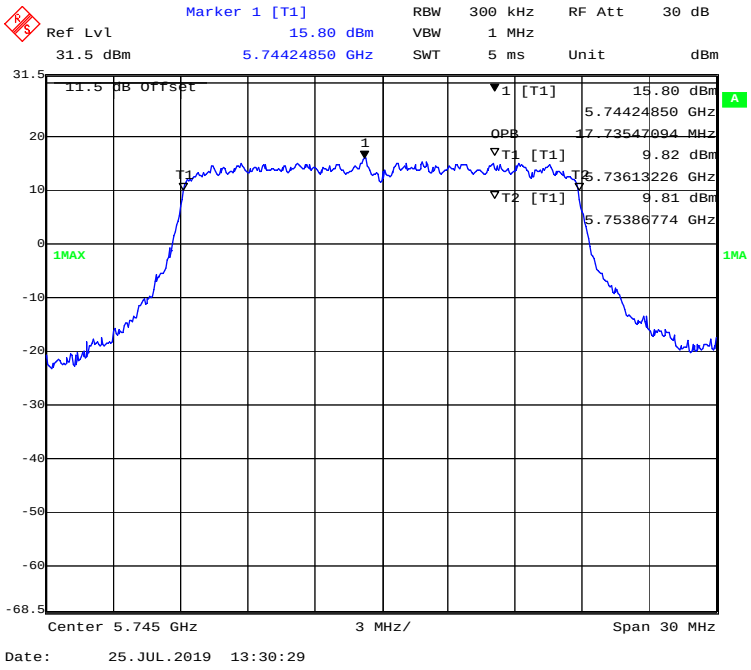
802.11a mode, 5785MHz



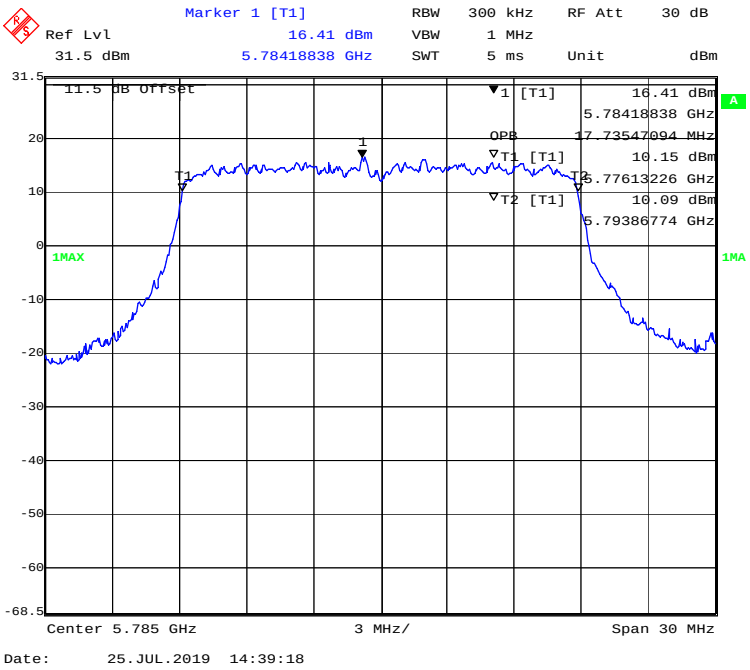
802.11a mode, 5825MHz



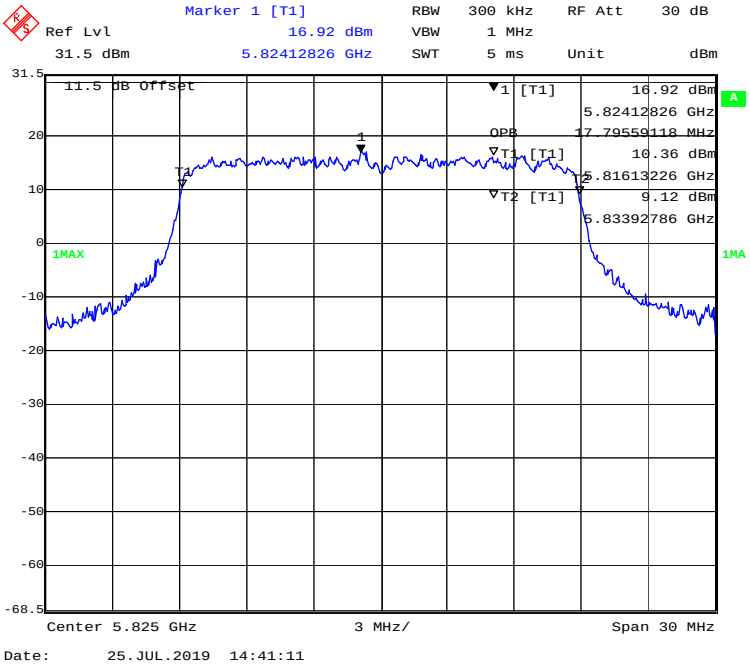
802.11ac20 mode, 5745MHz



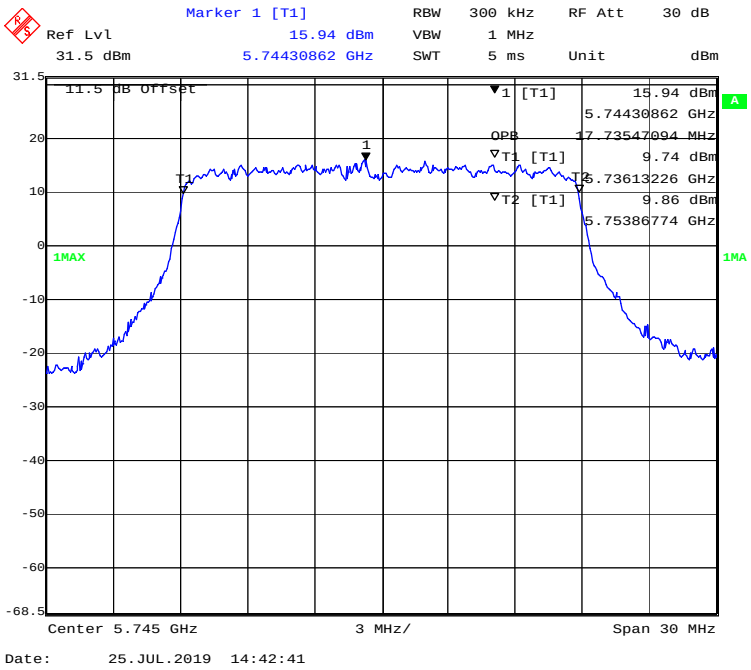
802.11 ac20 mode, 5785MHz



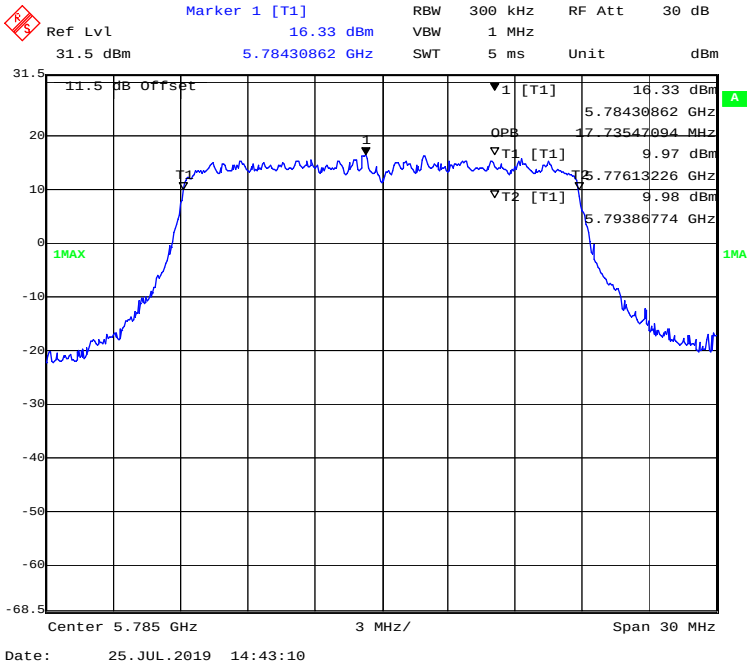
802.11 ac20 mode, 5825MHz



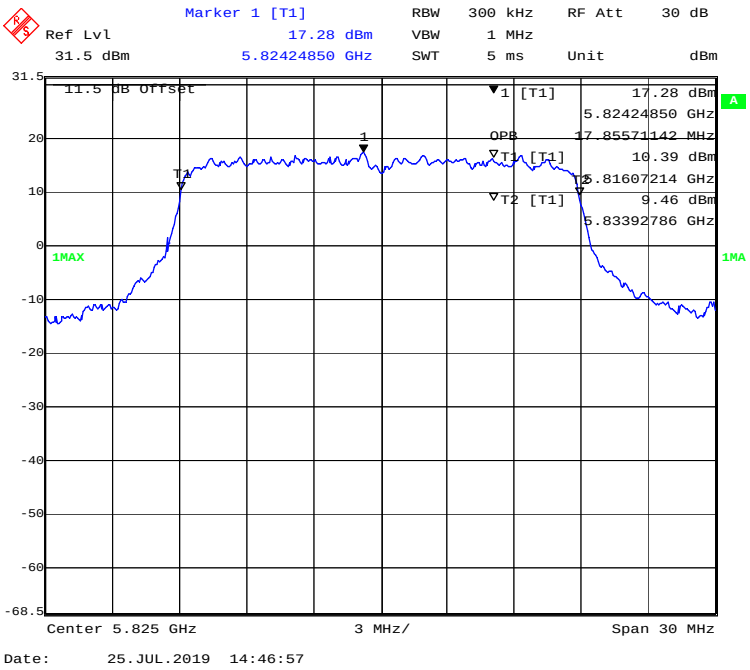
802.11n-HT20 mode, 5745MHz



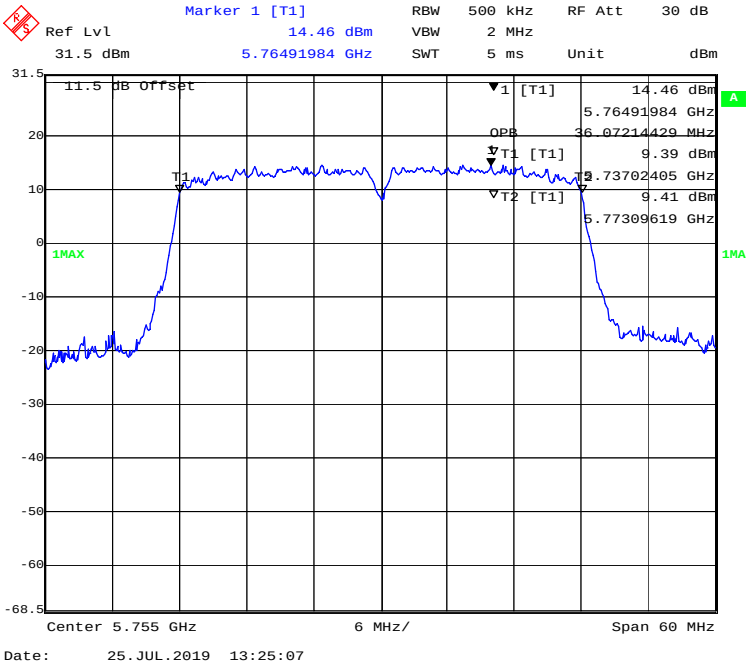
802.11n-HT20 mode, 5785MHz



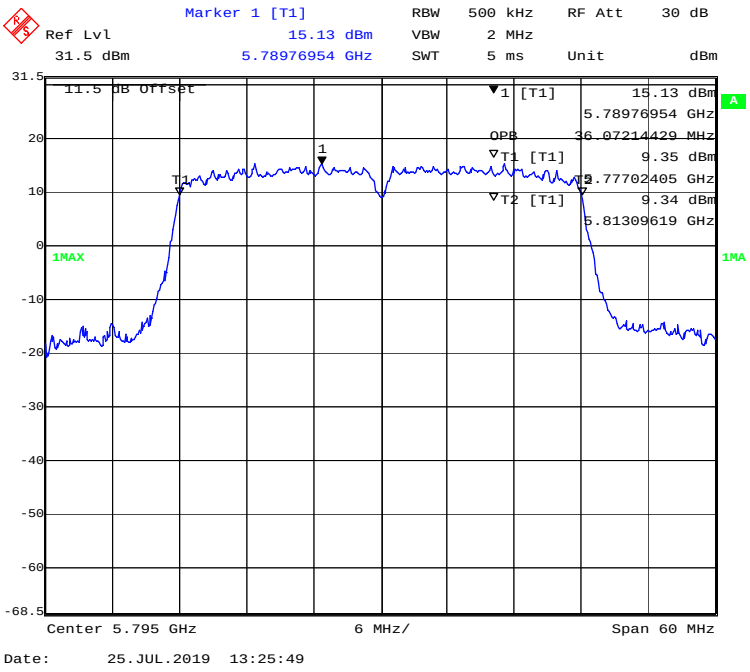
802.11n-HT20 mode, 5825MHz



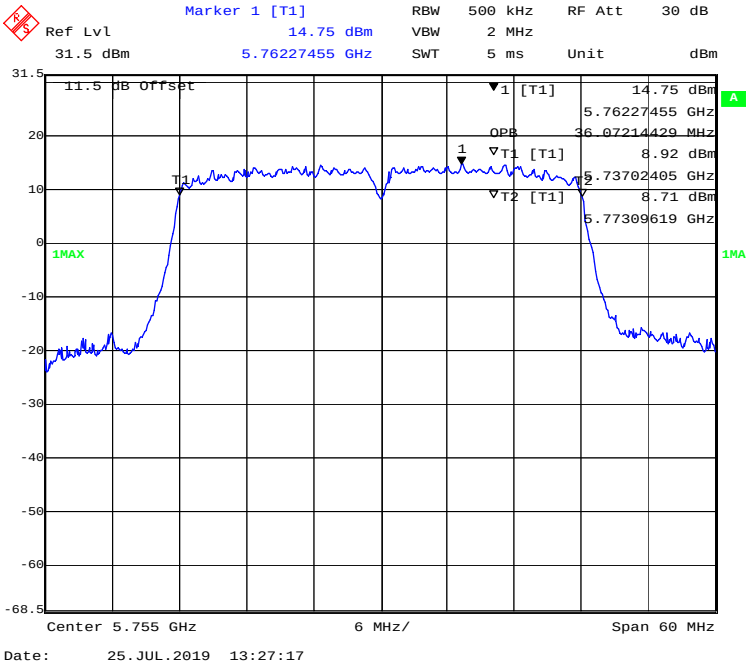
802.11ac40 mode, 5755MHz



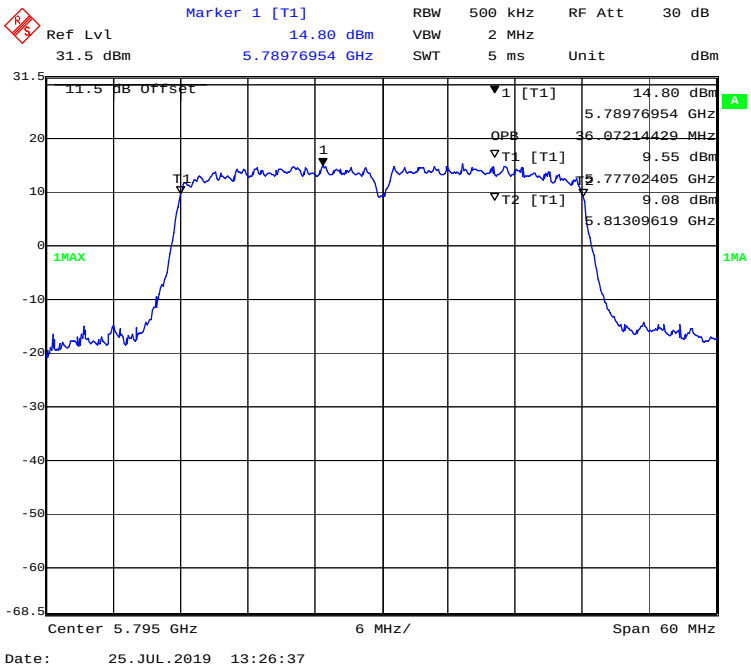
802.11 ac40 mode, 5795MHz



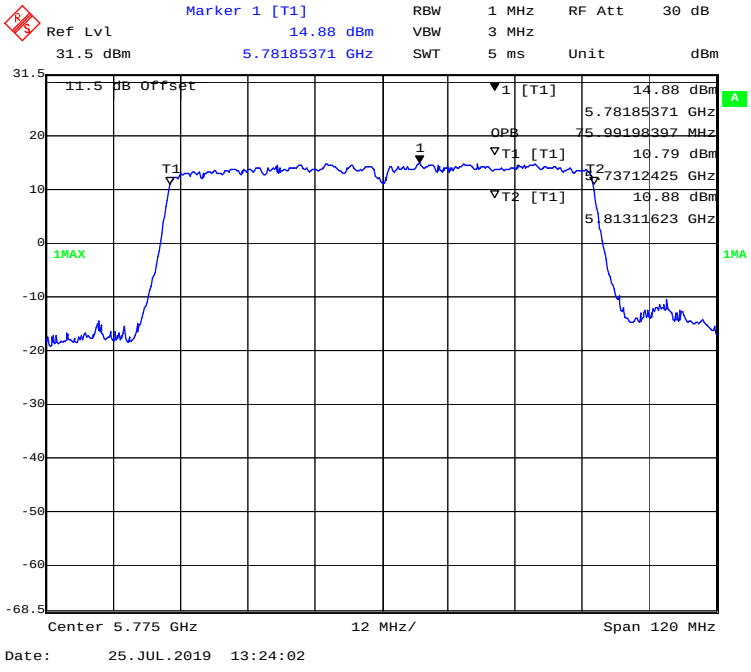
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz



802.11n-ac80 mode, 5775MHz



FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

According to §15.407(a)(1)

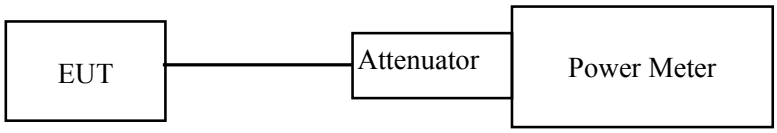
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Max Min on 2019-07-29.

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)			Limit	Result
				Chain0	Chain1	Total	(dBm)	
802.11a	5150-5250 MHz	Low	5180	24.53	24.60	/	30	PASS
		Middle	5200	24.74	24.59	/	30	PASS
		High	5240	24.61	24.48	/	30	PASS
	5725-5850 MHz	Low	5745	24.62	24.54	/	30	PASS
		Middle	5785	24.58	24.73	/	30	PASS
		High	5825	24.64	24.53	/	30	PASS
802.11n-HT20	5150-5250 MHz	Low	5180	22.01	22.03	25.03	30	PASS
		Middle	5200	22.67	22.86	25.78	30	PASS
		High	5240	22.63	22.81	25.73	30	PASS
	5725-5850 MHz	Low	5745	24.57	24.61	27.60	30	PASS
		Middle	5785	24.52	24.78	27.66	30	PASS
		High	5825	24.75	24.51	27.64	30	PASS
802.11n-HT40	5150-5250 MHz	Low	5190	19.28	19.18	22.24	30	PASS
		High	5230	24.15	24.46	27.32	30	PASS
	5725-5850 MHz	Low	5755	24.15	24.39	27.28	30	PASS
		High	5795	24.14	24.66	27.42	30	PASS
802.11ac20	5150-5250 MHz	Low	5180	22.04	22.01	25.04	30	PASS
		Middle	5200	22.59	22.67	25.64	30	PASS
		High	5240	22.53	22.61	25.58	30	PASS
	5725-5850 MHz	Low	5745	25.01	24.68	27.86	30	PASS
		Middle	5785	24.68	24.65	27.68	30	PASS
		High	5825	24.96	24.45	27.72	30	PASS
802.11ac40	5150-5250 MHz	Low	5190	19.17	19.02	22.11	30	PASS
		High	5230	24.16	24.47	27.33	30	PASS
	5725-5850 MHz	Low	5755	24.14	24.31	27.24	30	PASS
		High	5795	24.25	24.59	27.43	30	PASS
802.11ac80	5150-5250 MHz	/	5210	17.36	17.04	20.21	30	PASS
	5725-5850 MHz	/	5775	20.89	20.35	23.64	30	PASS

Note 1: The total output power=10Log10(10^(Chain 0/10)+10^(Chain 1/10))
Note 2: The maximum antenna gain is 5.13 dBi, the device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:
Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
So: Directional gain = GANT + Array Gain = 5.13dBi < 6dBi

FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY

Applicable Standard

According to §15.407(a)(1)

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedyres New Rules v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Maximum power spectral density (PPSD)

Test Data

Environmental Conditions

Temperature:	24.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Max Min on 2019-07-25.

Test Mode: Transmitting

5150MHz-5250MHz:

Mode	Channel	Frequency (MHz)	PSD (dBm/MHz)			Limit (dBm/MHz)	Result
			Chain0	Chain1	Total		
802.11a	Low	5180	13.98	11.88	/	17	PASS
	Middle	5200	14.39	13.89	/	17	PASS
	High	5240	14.08	13.91	/	17	PASS
802.11ac20	Low	5180	11.60	11.03	14.33	14.86	PASS
	Middle	5200	11.86	11.84	14.85	14.86	PASS
	High	5240	11.34	11.86	14.61	14.86	PASS
802.11n20	Low	5180	11.14	11.16	14.16	14.86	PASS
	Middle	5200	11.45	11.91	14.70	14.86	PASS
	High	5240	11.50	11.70	14.61	14.86	PASS
802.11ac40	Low	5190	5.28	4.96	8.13	14.86	PASS
	High	5230	10.46	10.47	13.48	14.86	PASS
802.11n40	Low	5190	5.55	5.27	8.42	14.86	PASS
	High	5230	10.32	10.57	13.46	14.86	PASS
802.11ac80	/	5210	0.01	-0.26	2.89	14.86	PASS

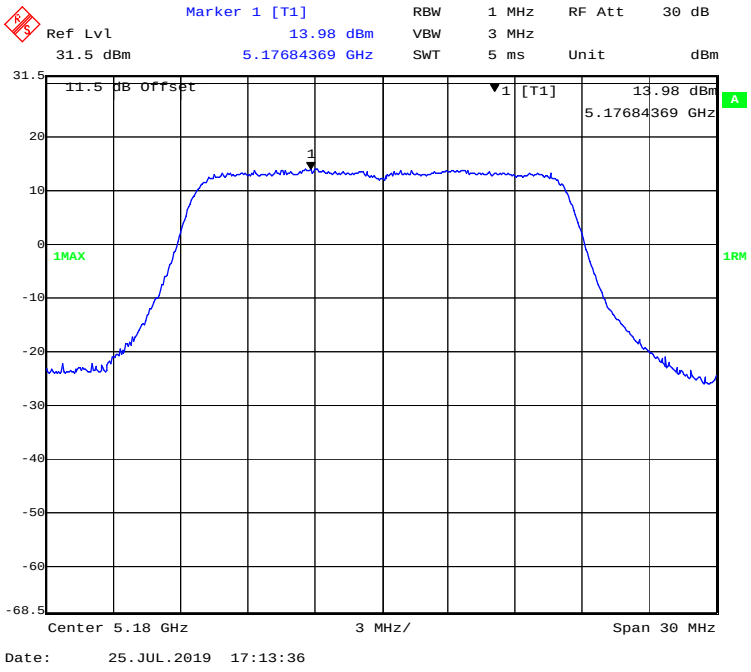
5725MHz-5850MHz:

Mode	Channel	Frequency MHz	PSD (dBm/500kHz)			Limit (dBm/500kHz)	Result
			Chain0	Chain1	Total		
802.11a	Low	5745	13.92	13.74	/	30	PASS
	Middle	5785	13.83	13.77	/	30	PASS
	High	5825	14.02	13.70	/	30	PASS
802.11ac20	Low	5745	14.00	13.44	16.74	30	PASS
	Middle	5785	13.72	14.10	16.92	30	PASS
	High	5825	13.61	13.95	16.79	30	PASS
802.11n20	Low	5745	13.98	13.82	16.91	30	PASS
	Middle	5785	13.87	13.51	16.70	30	PASS
	High	5825	13.82	14.05	16.95	30	PASS
802.11ac40	Low	5755	10.50	10.21	13.37	30	PASS
	High	5795	10.41	11.08	13.77	30	PASS
802.11n40	Low	5755	10.54	10.67	13.62	30	PASS
	High	5795	10.80	10.85	13.84	30	PASS
802.11ac80	/	5775	7.19	6.97	10.09	30	PASS

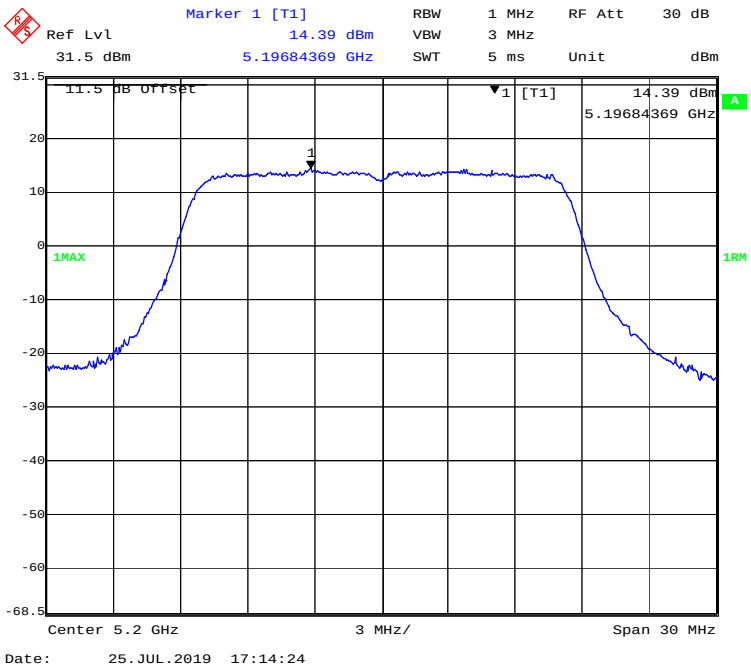
Note1: The total PSD=10Log10(10^(Chain 0/10)+10^(Chain 1/10))
Note2: The maximum antenna gain is 5.13 dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD)measurements on the devices:
Array Gain = 10 log(N_{ANT}/N_{SS}) dB.
So: Directional gain = GANT + Array Gain = 5.13+10*log(2/1) =8.14 dBi, power spectral density limit reduced 8.14-6=2.14dB.

5150MHz-5250MHz Band-chain0 :

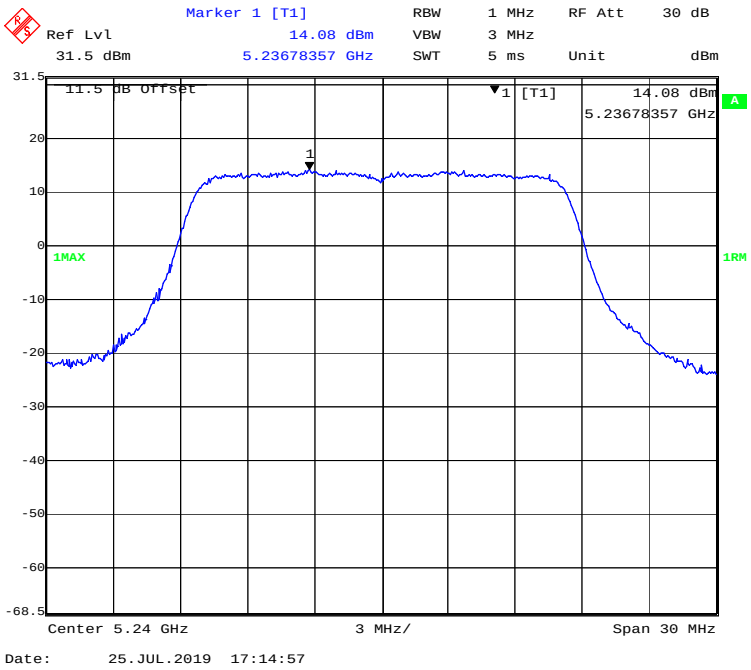
802.11a mode, Power spectral density-5180MHz



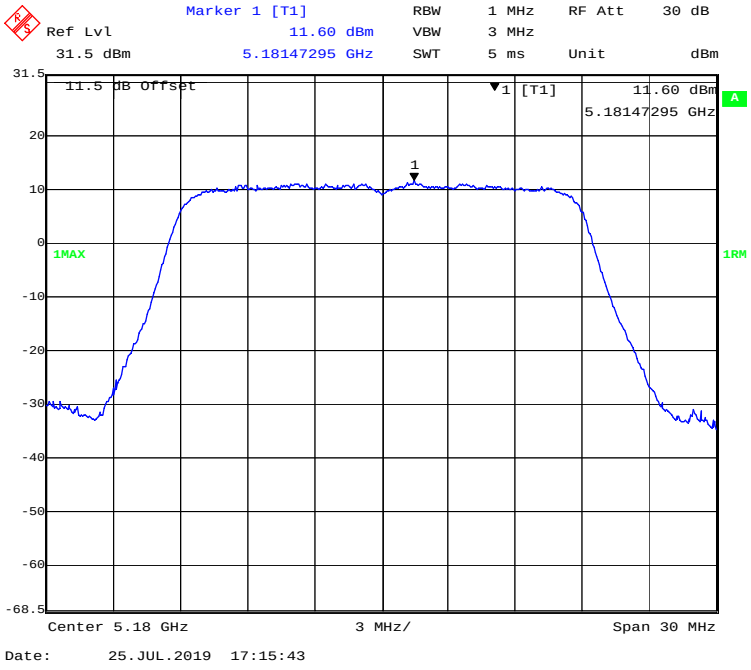
802.11a mode, Power spectral density-5200MHz



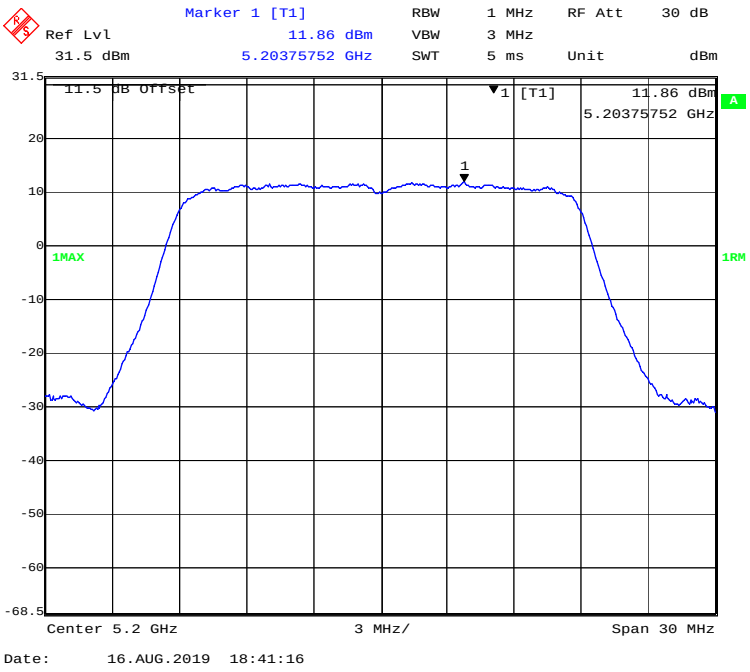
802.11a mode, Power spectral density-5240MHz



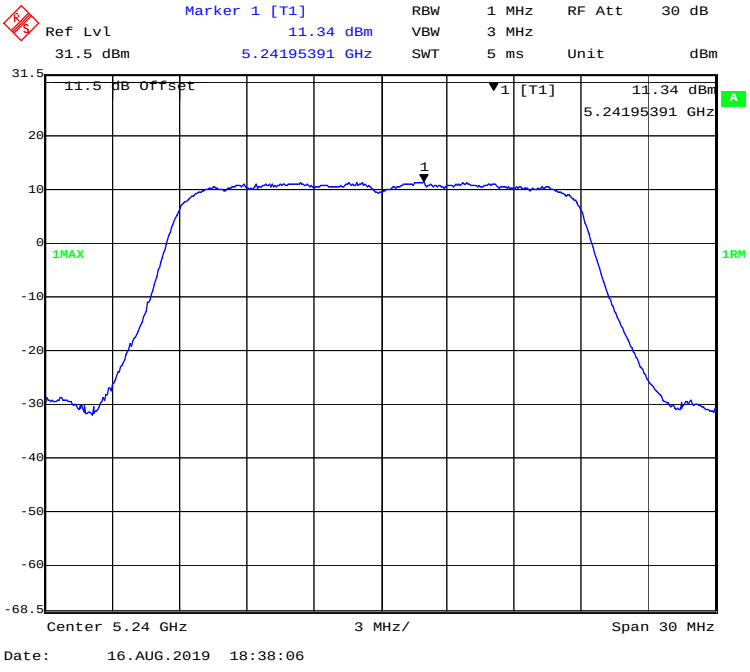
802.11ac20 mode, Power spectral density-5180MHz



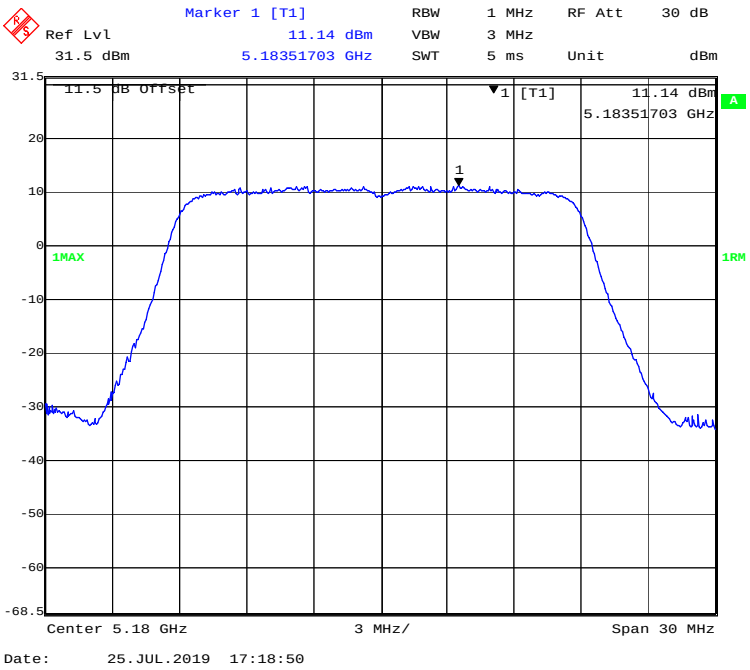
802.11 ac20 mode, Power spectral density-5200MHz



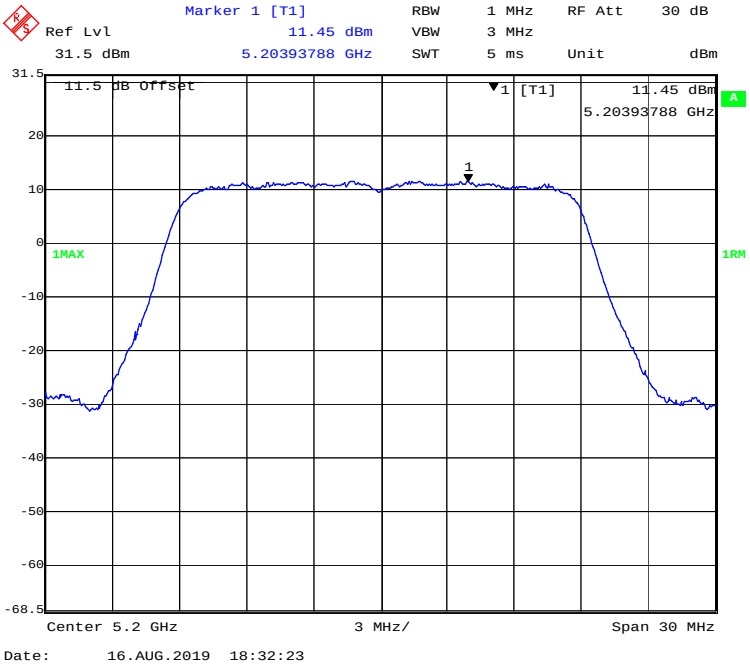
802.11ac20 mode, Power spectral density-5240MHz



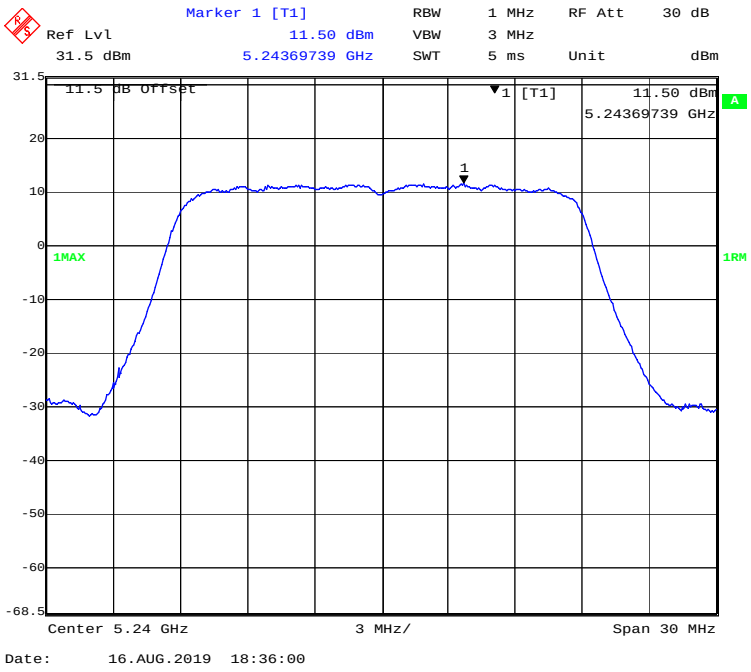
802.11n-HT20 mode, Power spectral density-5180MHz



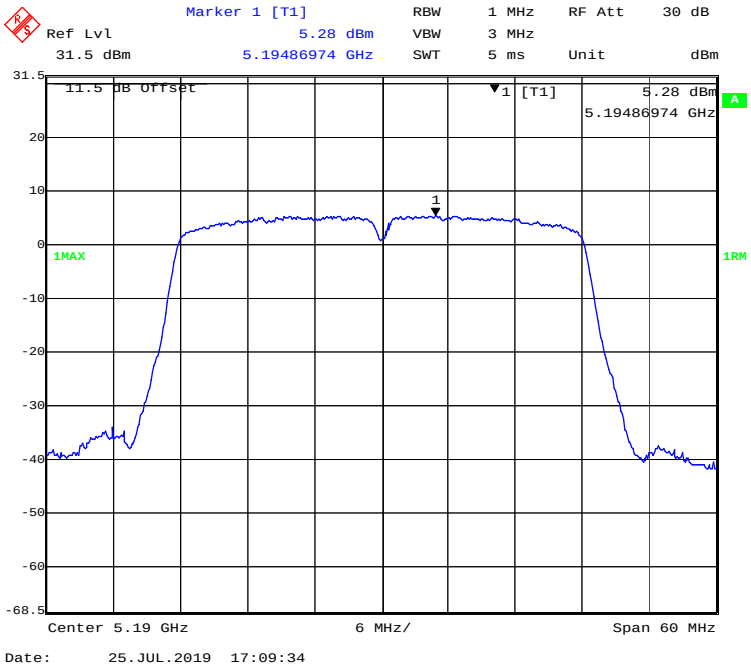
802.11n-HT20 mode, Power spectral density-5200MHz



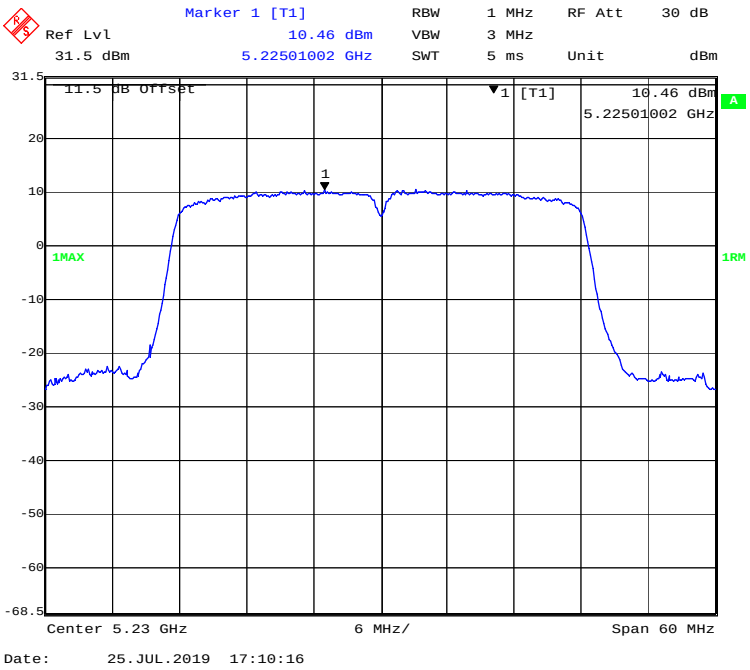
802.11n-HT20 mode, Power spectral density-5240MHz



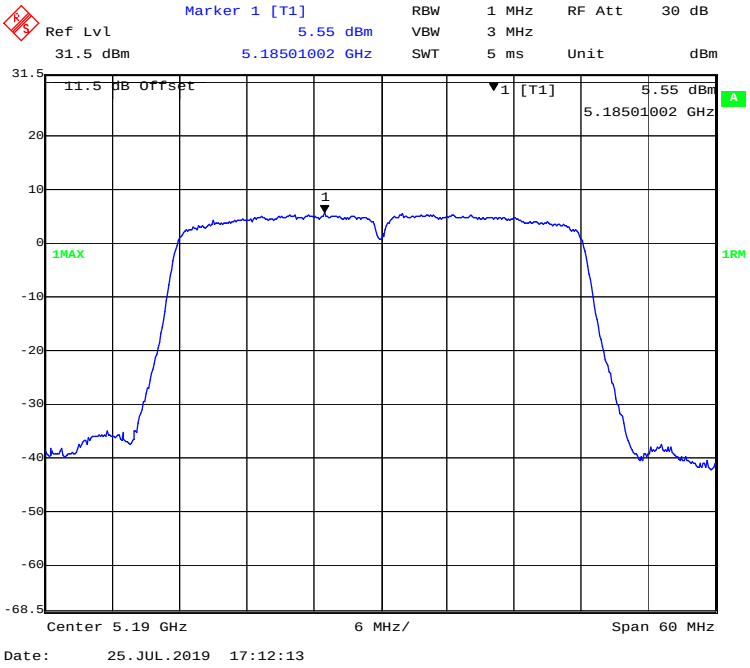
802.11ac40 mode, Power spectral density-5190MHz



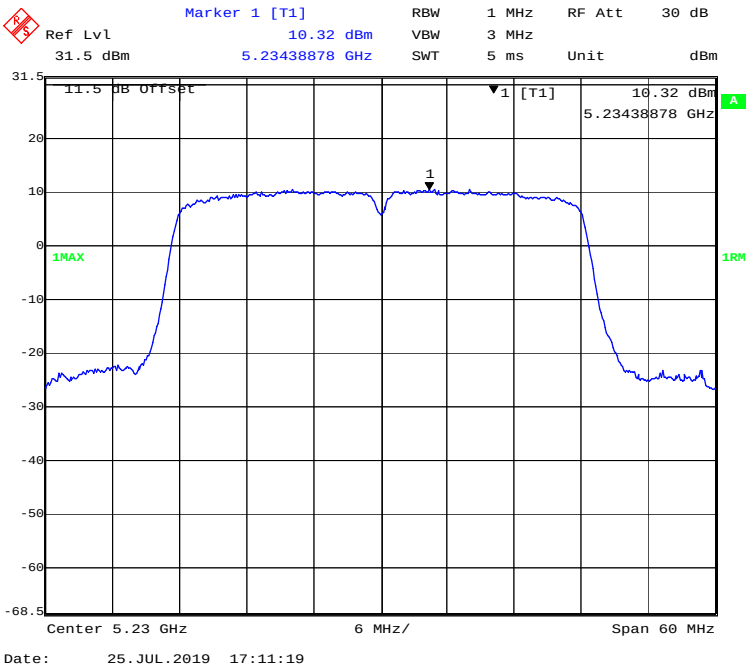
802.11 ac40 mode, Power spectral density-5230MHz



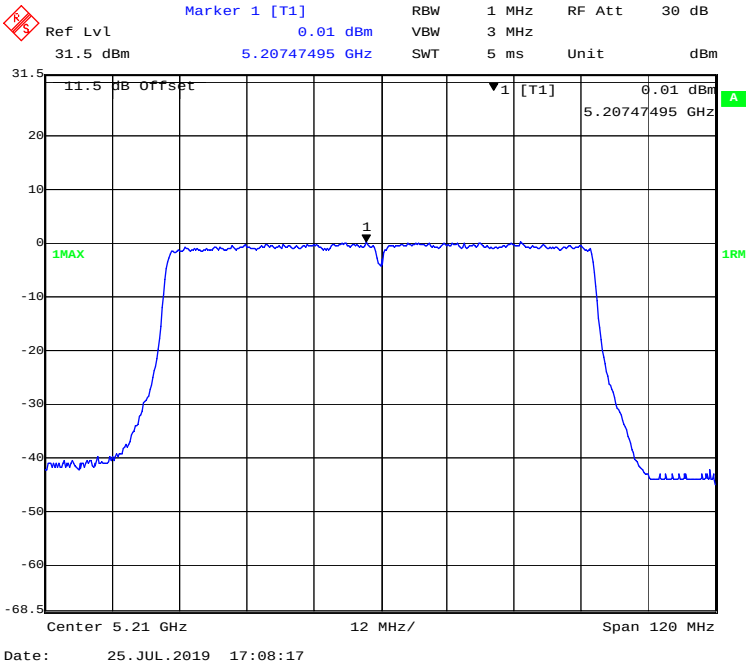
802.11n-HT40 mode, Power spectral density-5190MHz



802.11n-HT40 mode, Power spectral density-5230MHz

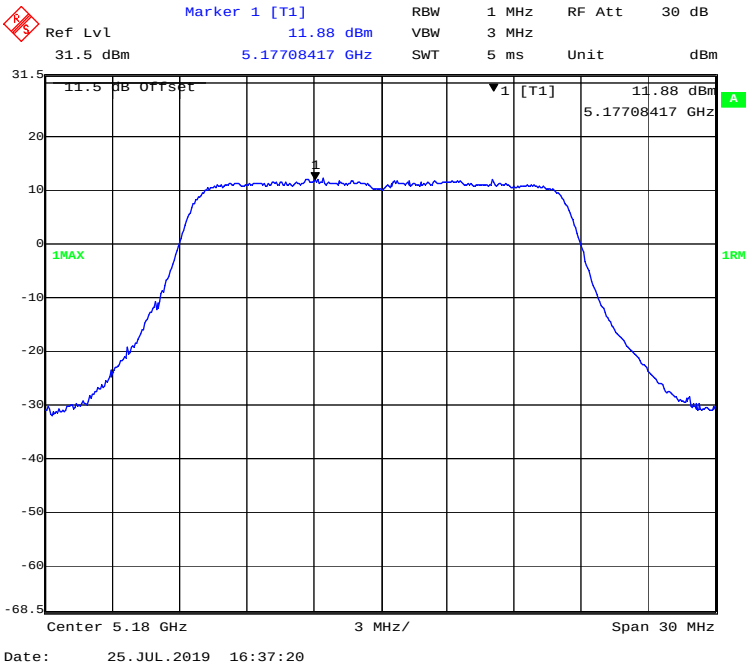


802.11n- ac80 mode, Power spectral density-5210MHz

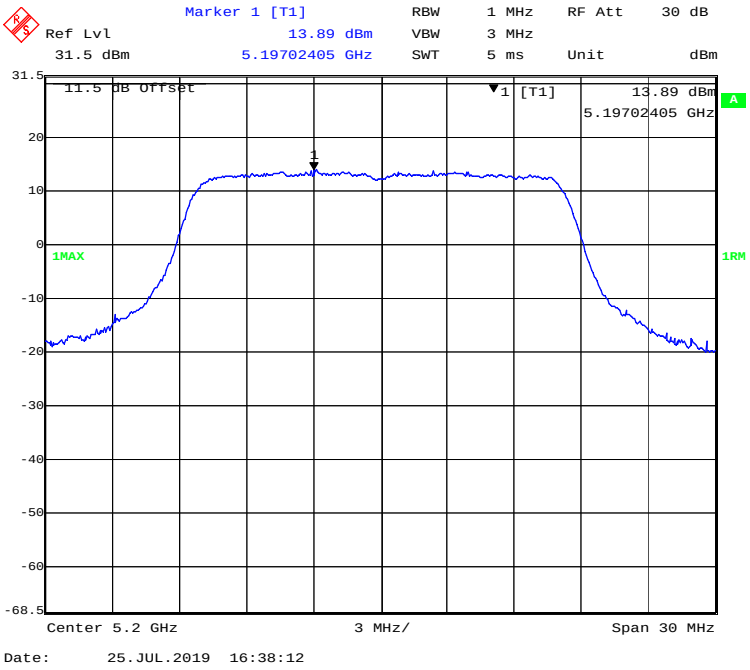


5150MHz-5250MHz Band-chain1 :

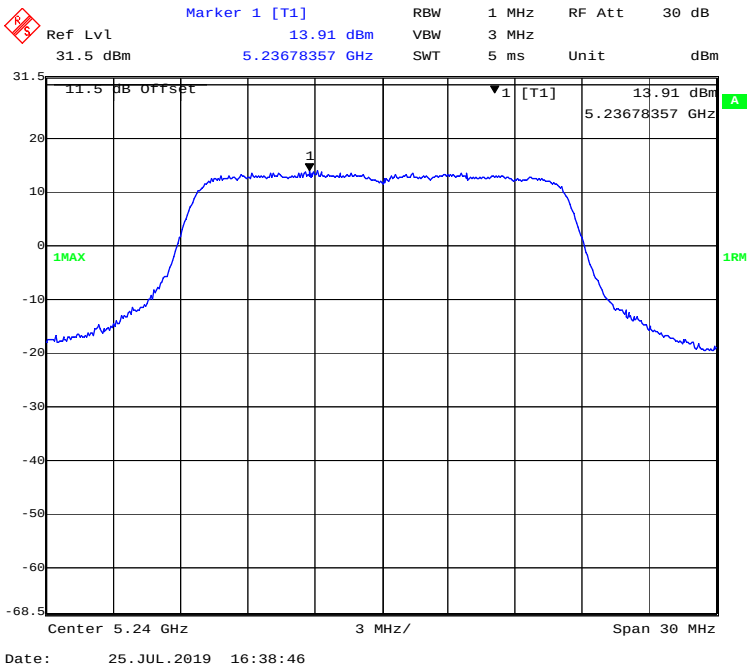
802.11a mode, Power spectral density-5180MHz



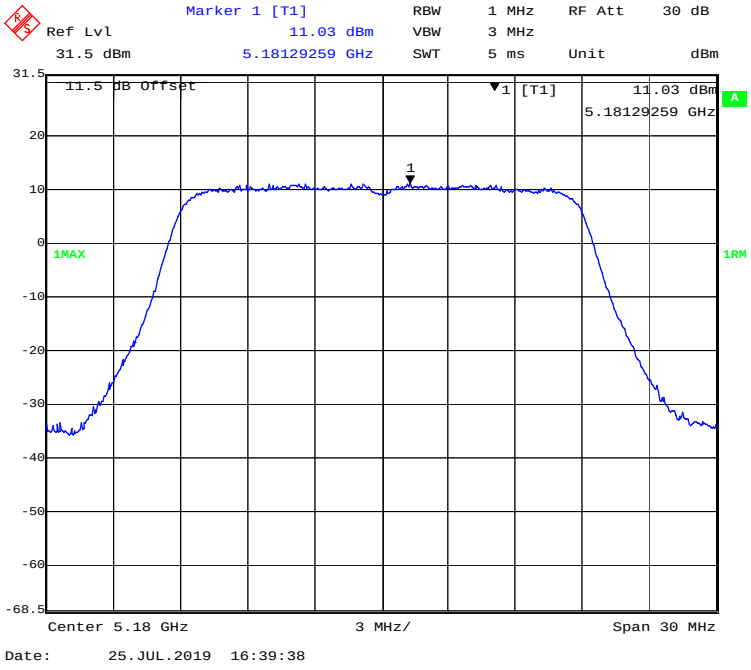
802.11a mode, Power spectral density-5200MHz



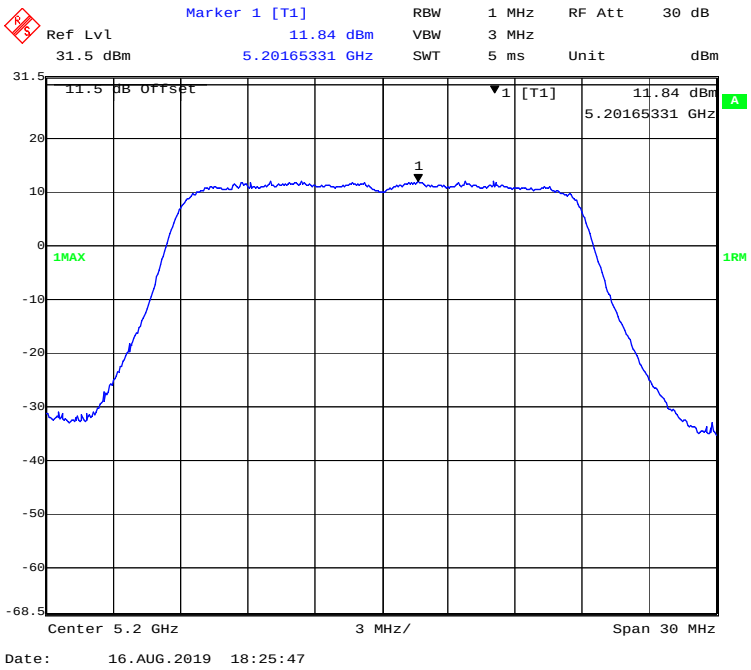
802.11a mode, Power spectral density-5240MHz



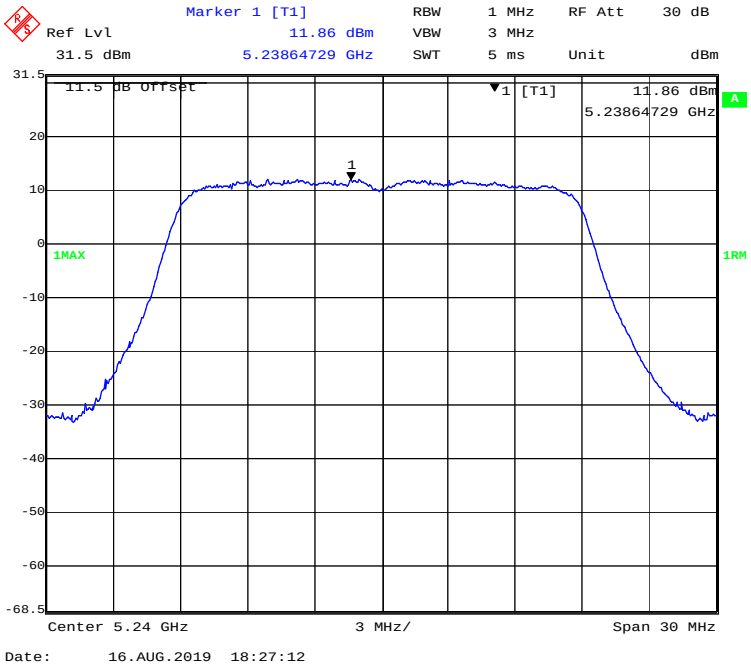
802.11ac20 mode, Power spectral density-5180MHz



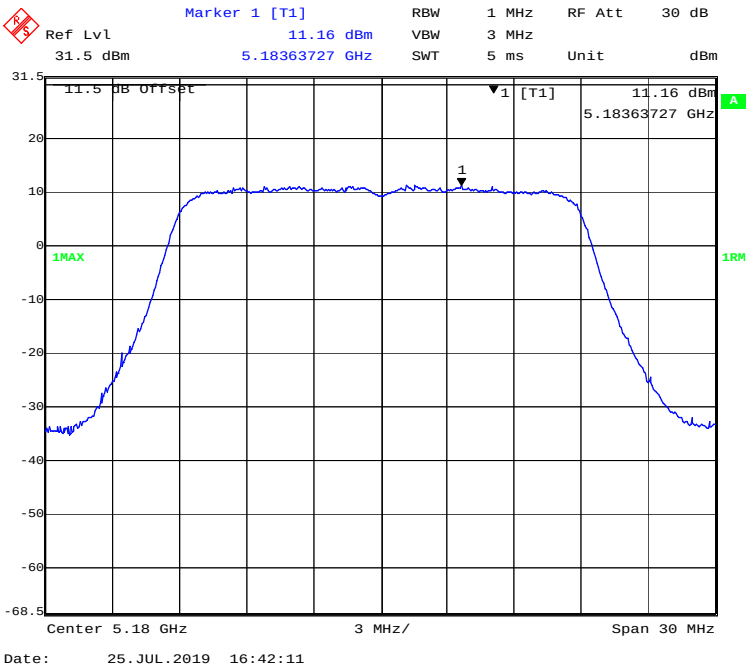
802.11 ac20 mode, Power spectral density-5200MHz



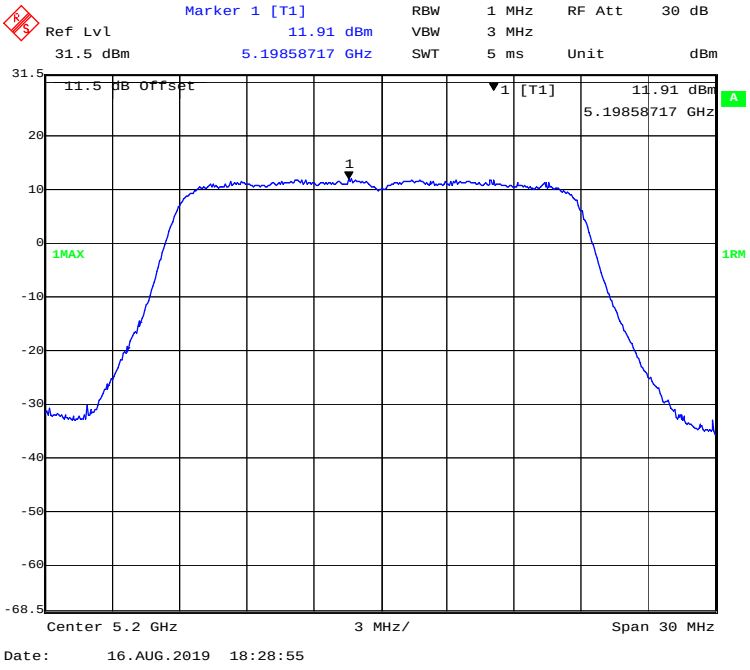
802.11ac20 mode, Power spectral density-5240MHz



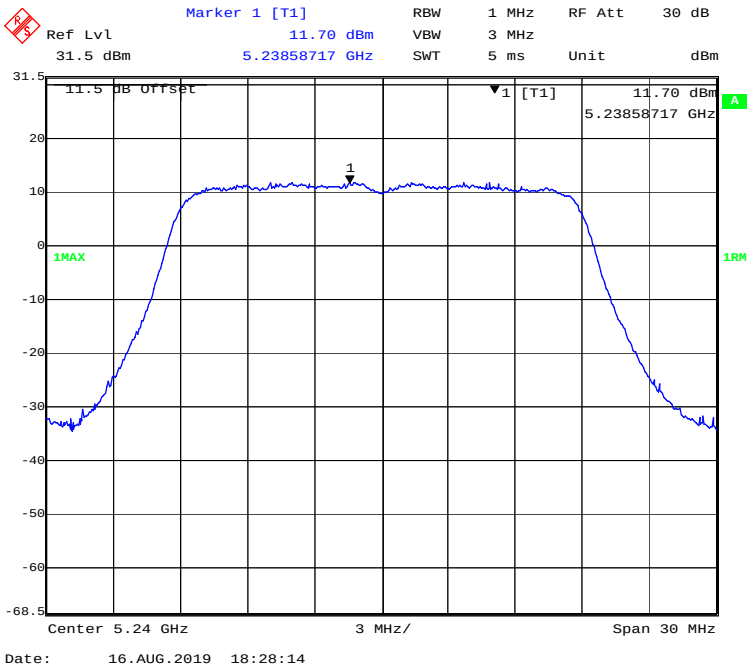
802.11n-HT20 mode, Power spectral density-5180MHz



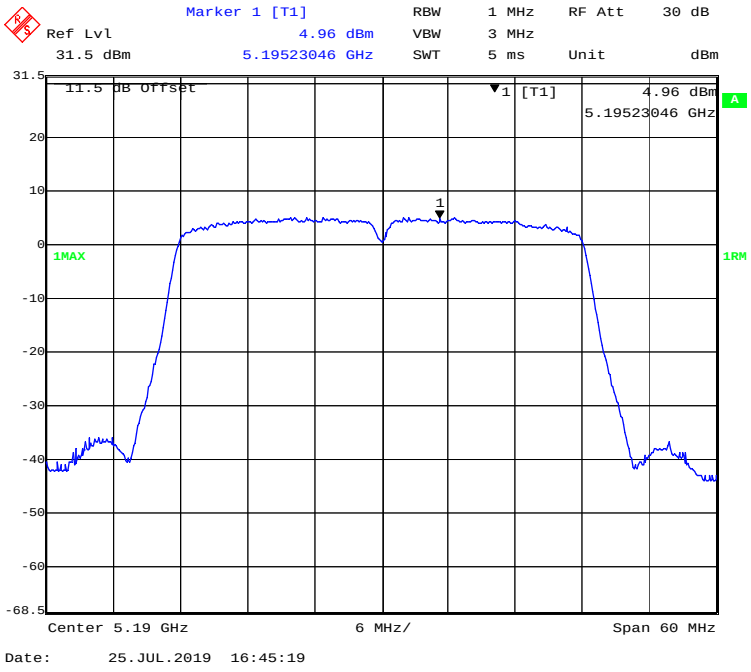
802.11n-HT20 mode, Power spectral density-5200MHz



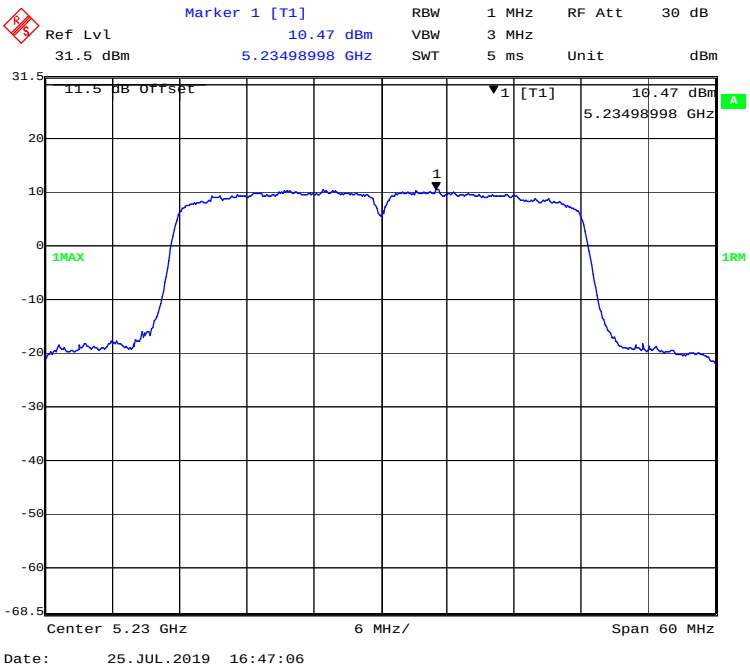
802.11n-HT20 mode, Power spectral density-5240MHz



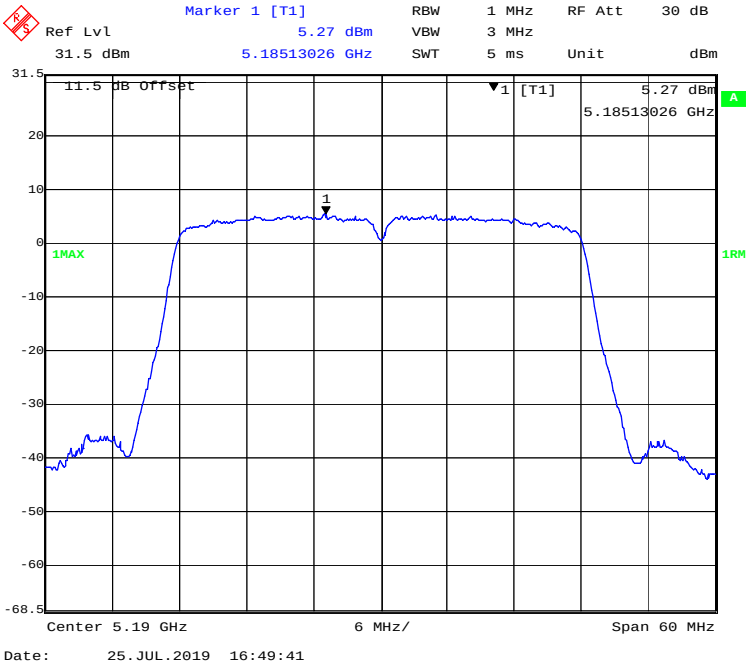
802.11ac40 mode, Power spectral density-5190MHz



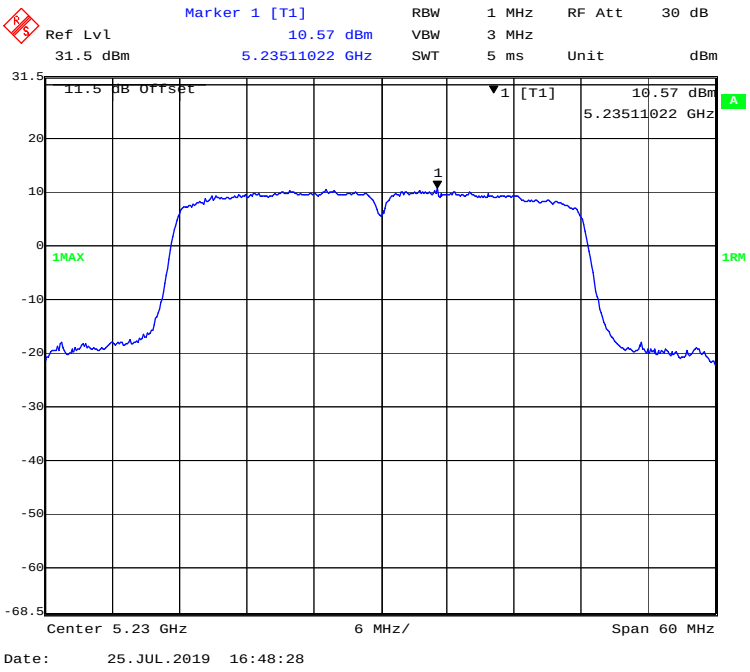
802.11 ac40 mode, Power spectral density-5230MHz



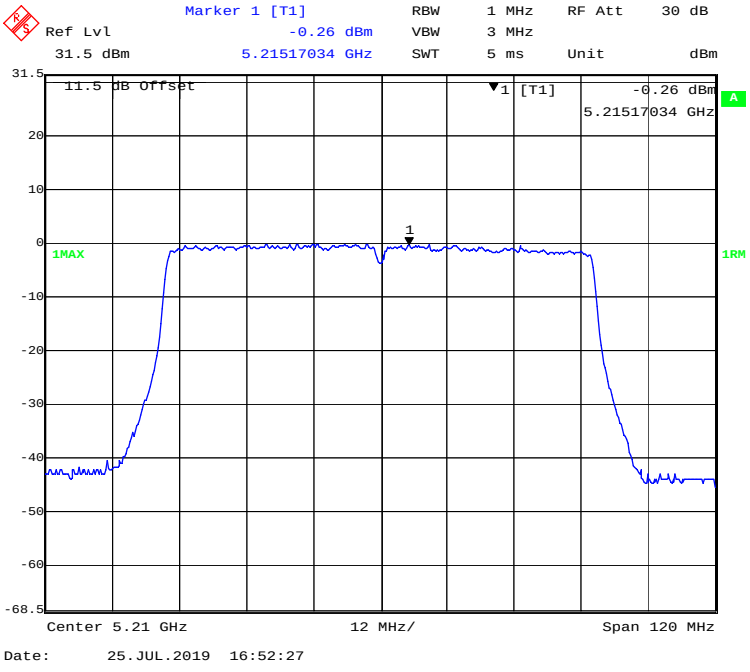
802.11n-HT40 mode, Power spectral density-5190MHz



802.11n-HT40 mode, Power spectral density-5230MHz

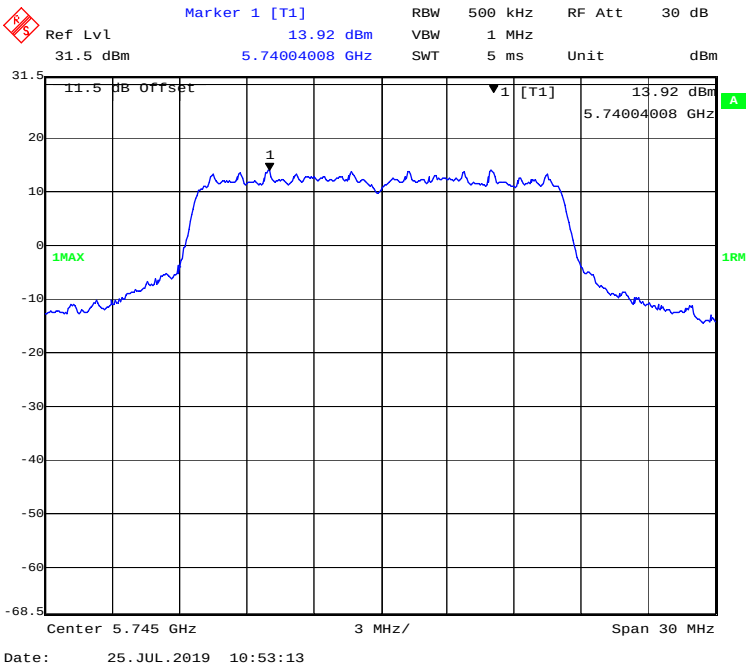


802.11n- ac80 mode, Power spectral density-5210MHz

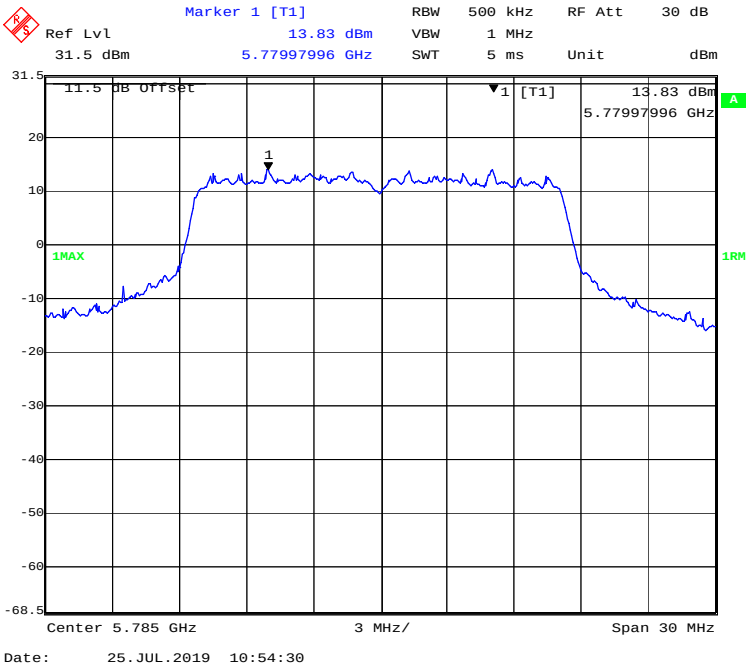


5725MHz-5850 MHz Band-chain0:

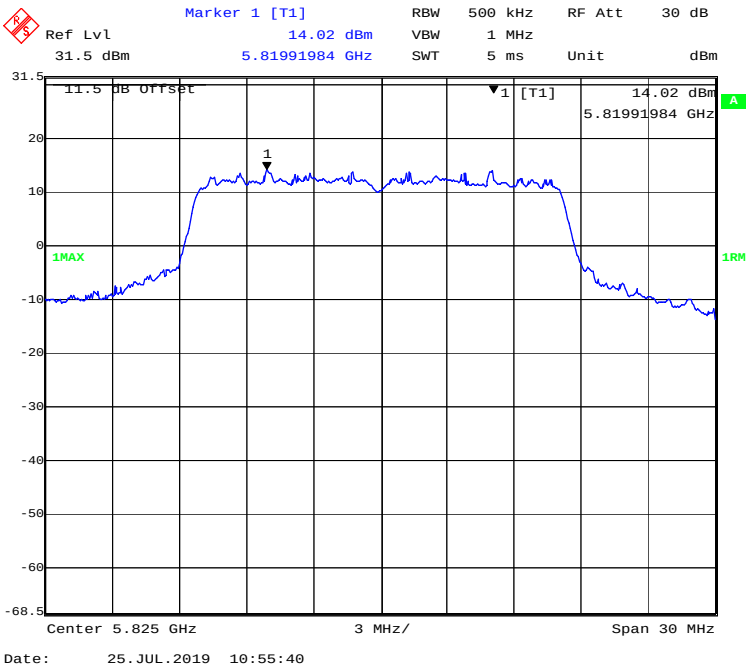
802.11a mode, Power spectral density-5745MHz



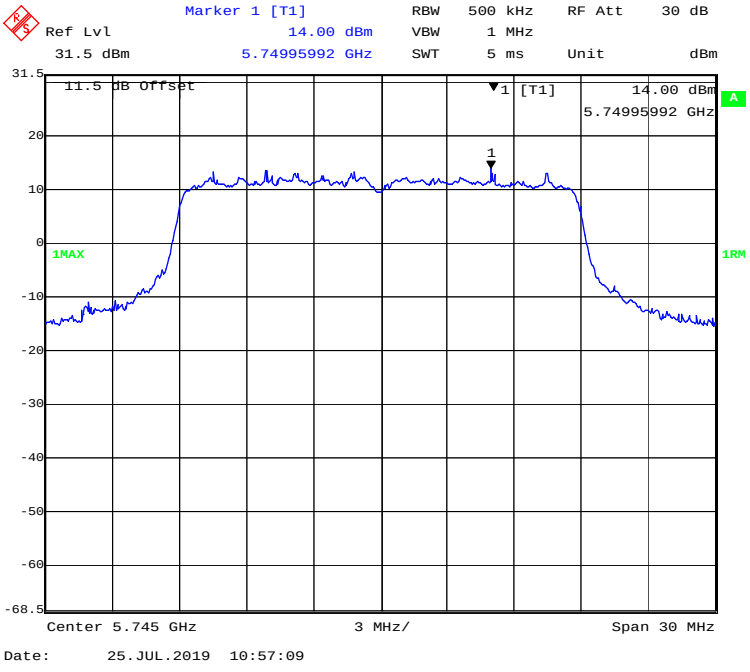
802.11a mode, Power spectral density-5785MHz



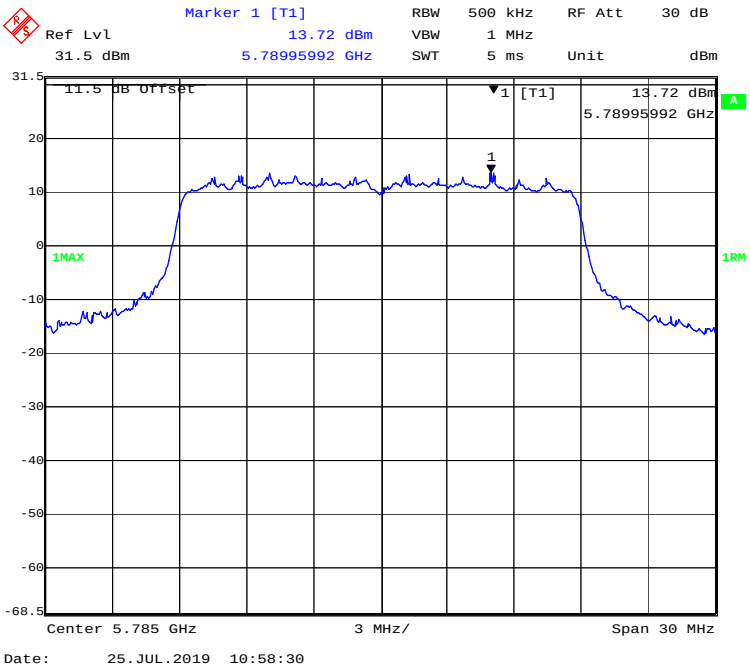
802.11a mode, Power spectral density-5825MHz



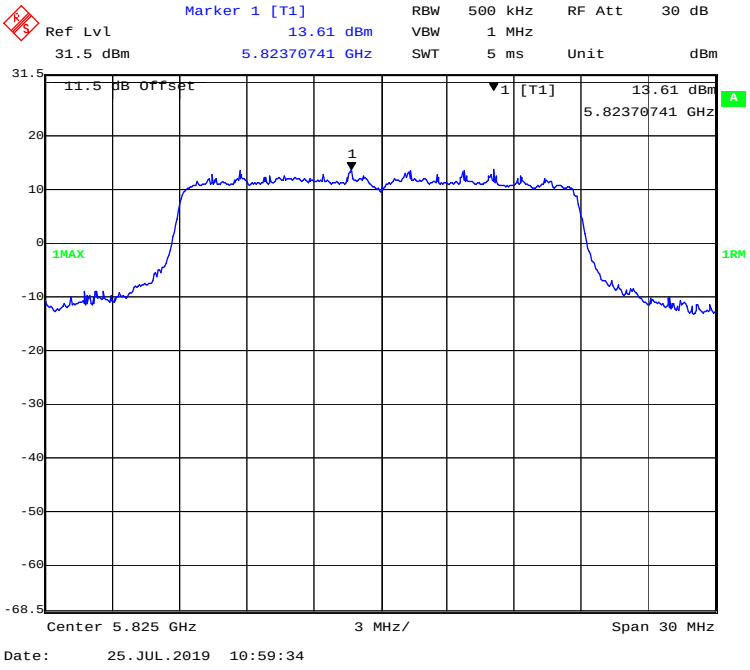
802.11ac20 mode, Power spectral density-5745MHz



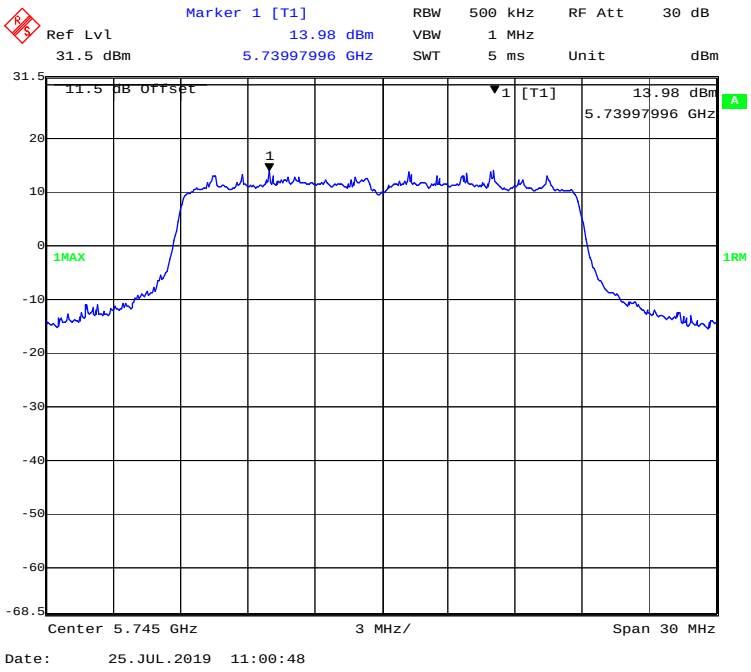
802.11 ac20 mode, Power spectral density-5785MHz



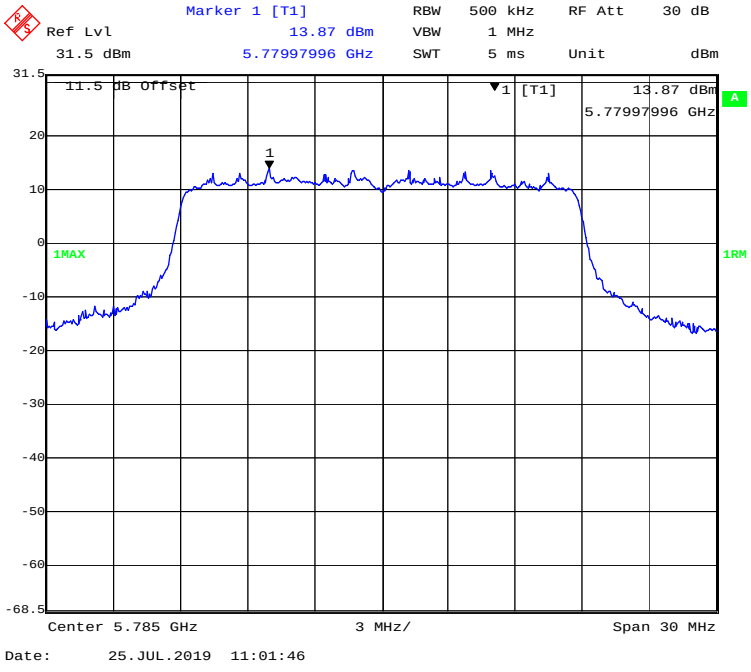
802.11 ac20 mode, Power spectral density-5825MHz



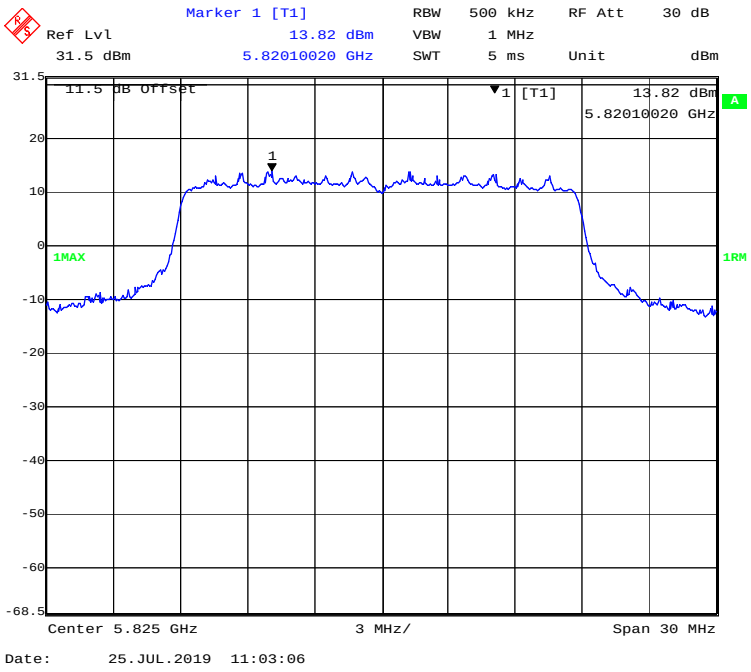
802.11n-HT20 mode, Power spectral density-5745MHz



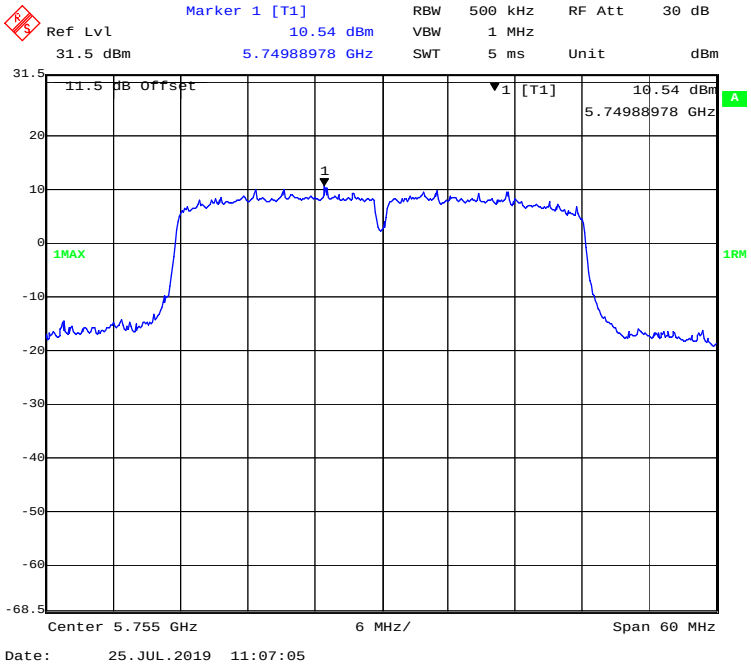
802.11n-HT20 mode, Power spectral density-5785MHz



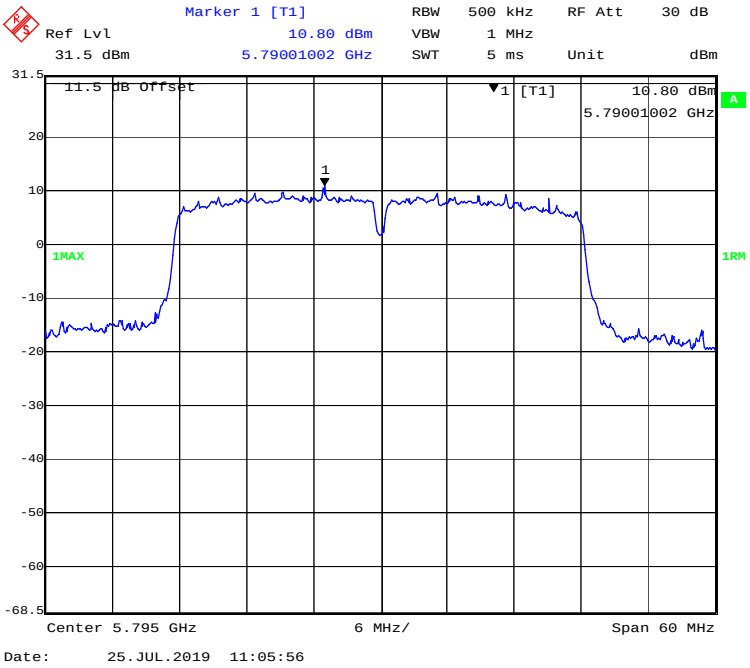
802.11n-HT20 mode, Power spectral density-5825MHz



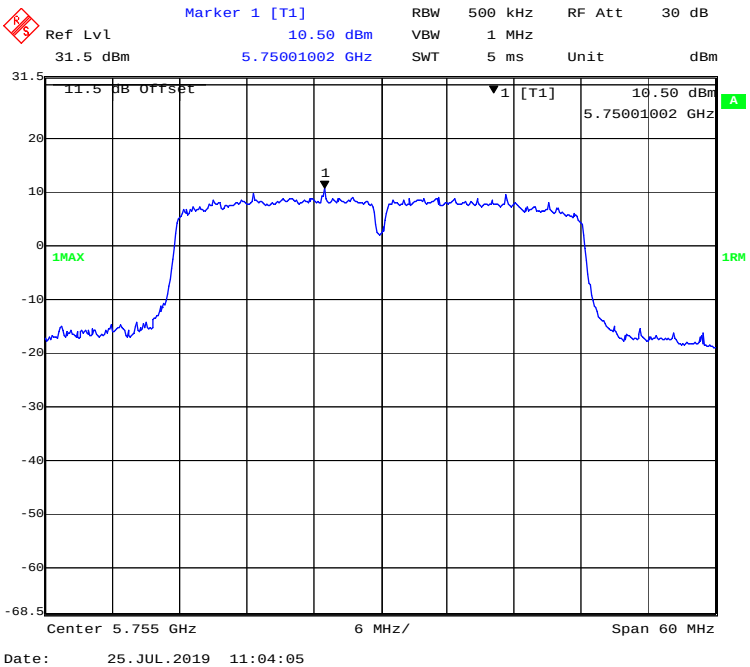
802.11ac40 mode, Power spectral density-5755MHz



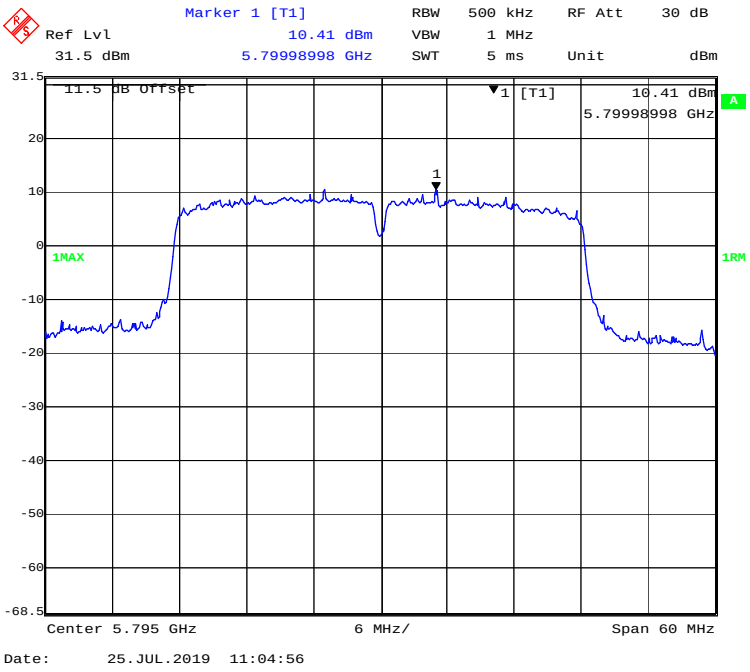
802.11 ac40 mode, Power spectral density-5795MHz



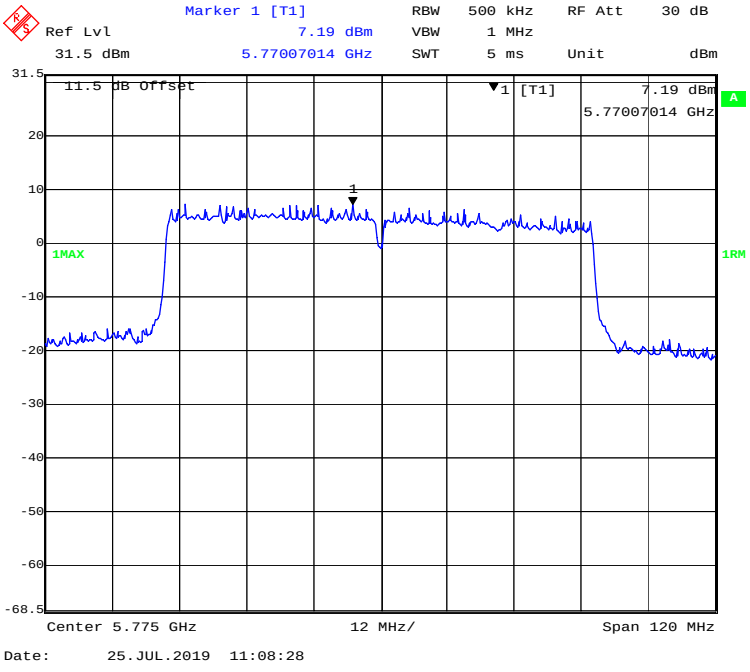
802.11n-ac40 mode, Power spectral density-5755MHz



802.11n-ac40 mode, Power spectral density-5795MHz

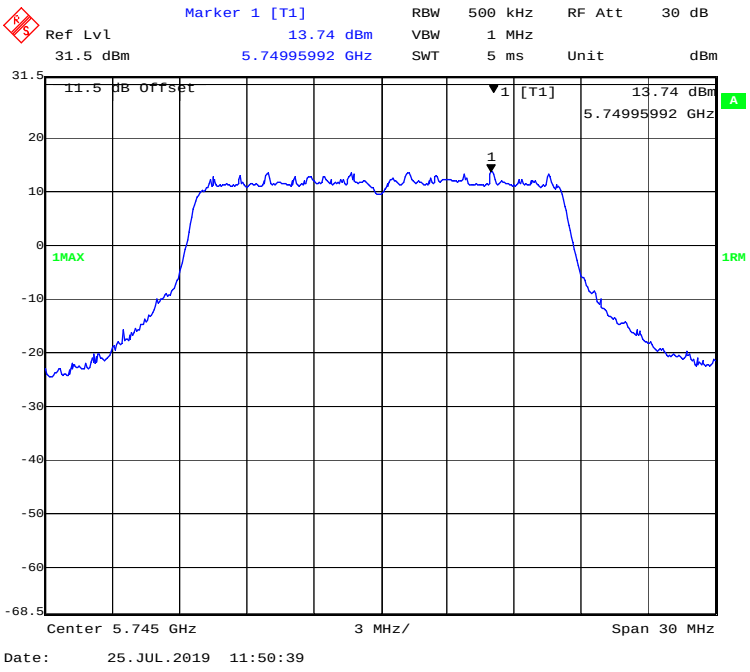


802.11 ac80 mode, Power spectral density-5775MHz

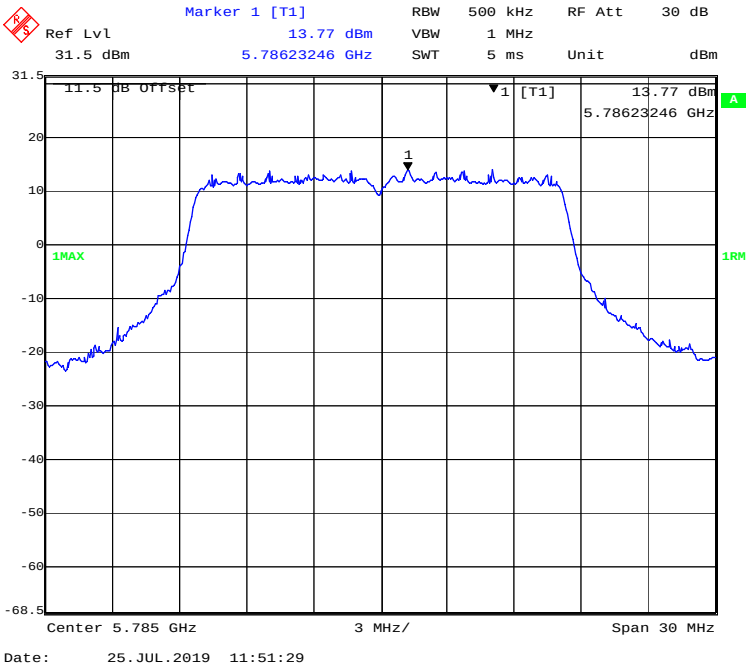


5725MHz-5850 MHz Band-chain1:

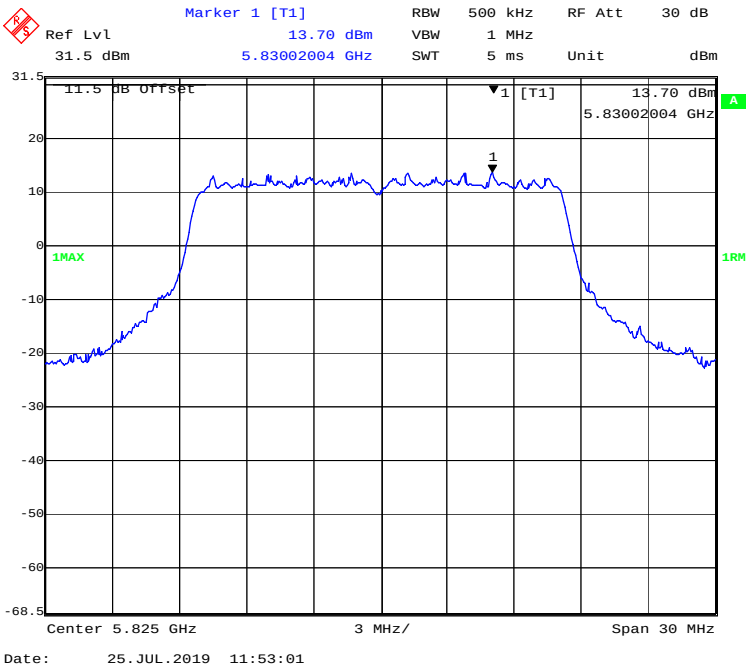
802.11a mode, Power spectral density-5745MHz



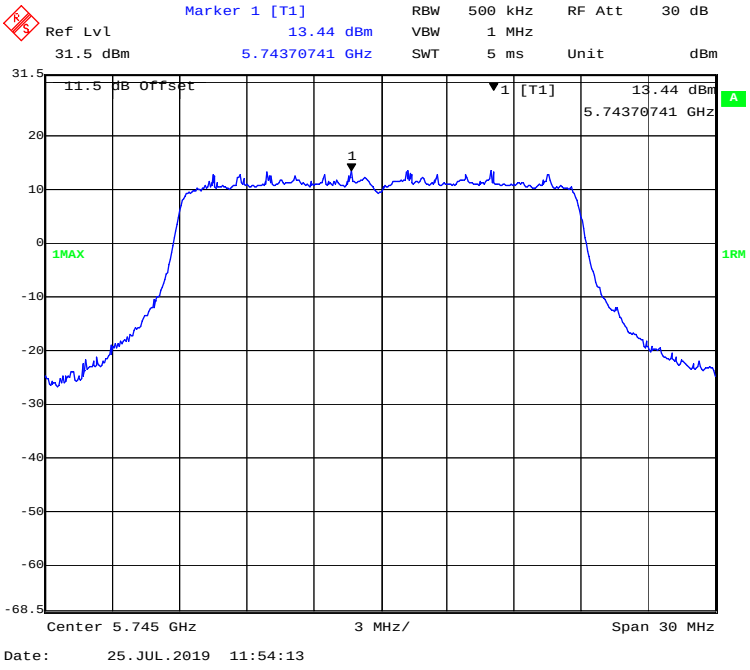
802.11a mode, Power spectral density-5785MHz



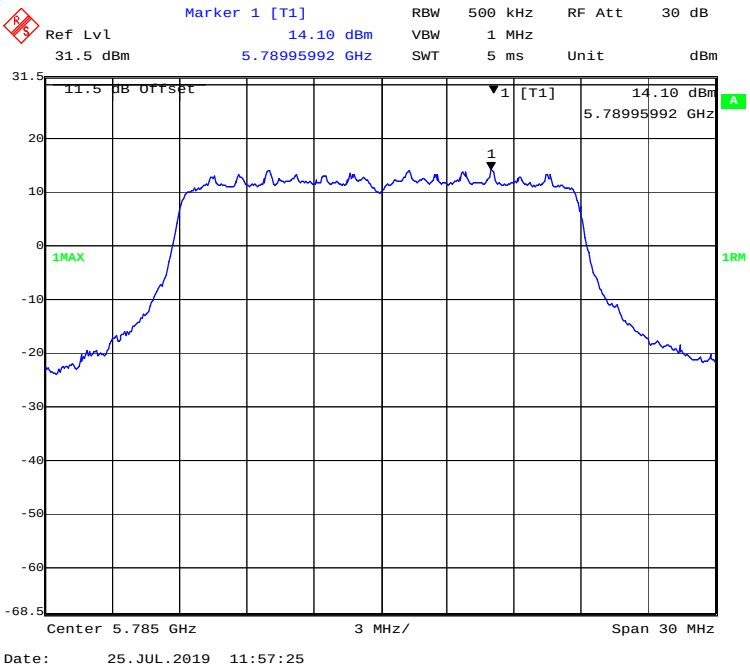
802.11a mode, Power spectral density-5825MHz



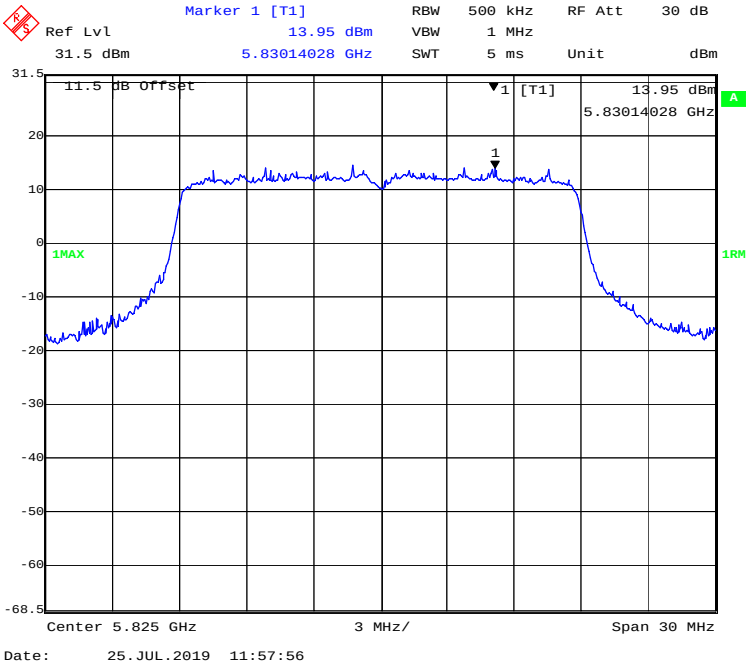
802.11ac20 mode, Power spectral density-5745MHz



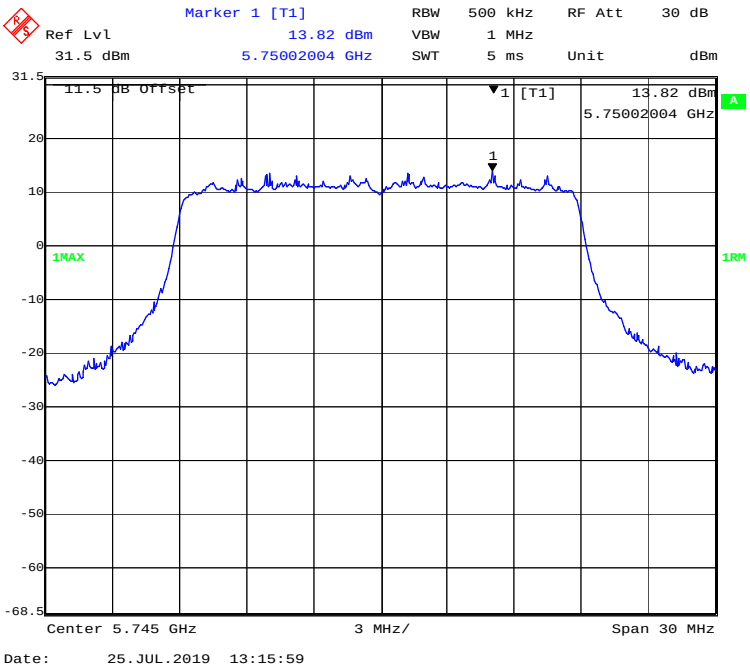
802.11 ac20 mode, Power spectral density-5785MHz



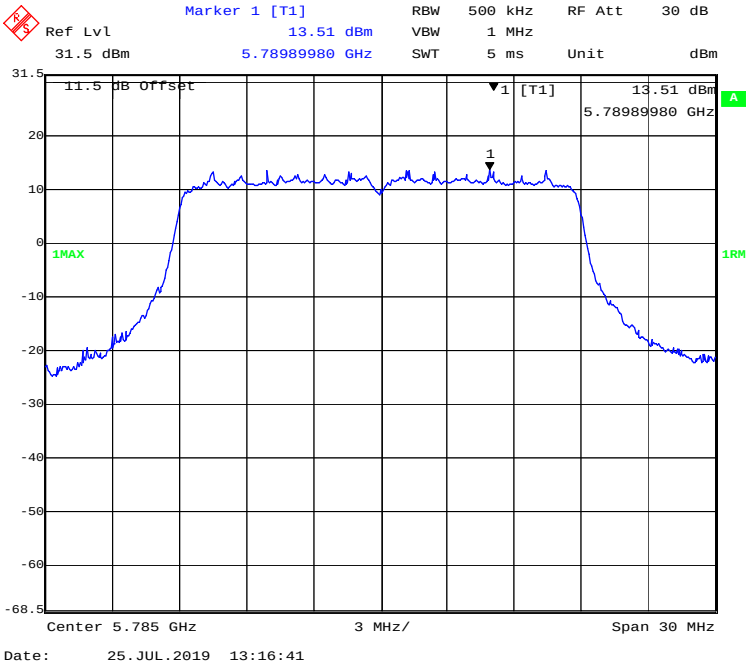
802.11 ac20 mode, Power spectral density-5825MHz



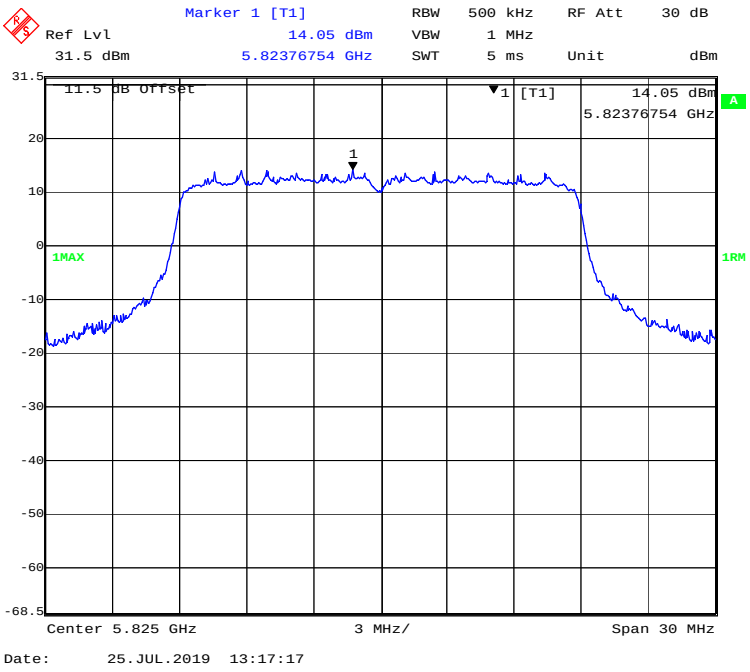
802.11n-HT20 mode, Power spectral density-5745MHz



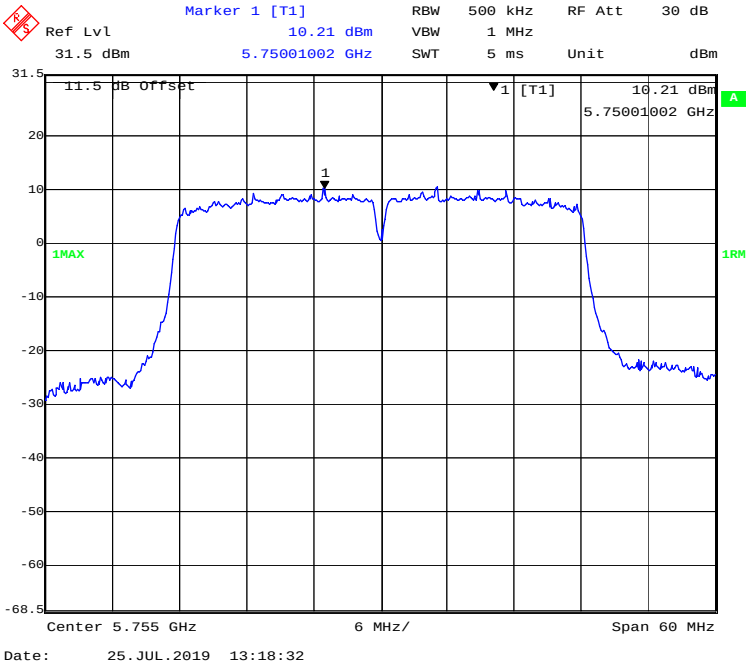
802.11n-HT20 mode, Power spectral density-5785MHz



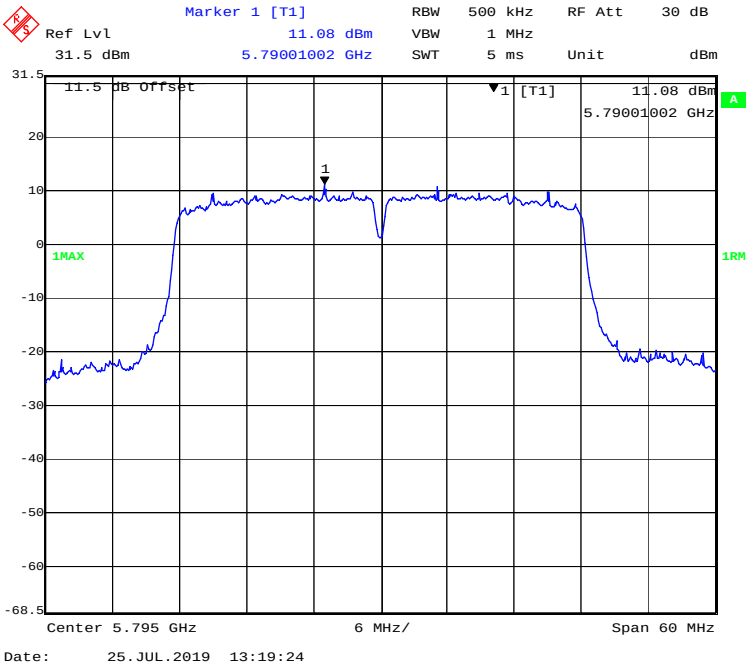
802.11n-HT20 mode, Power spectral density-5825MHz



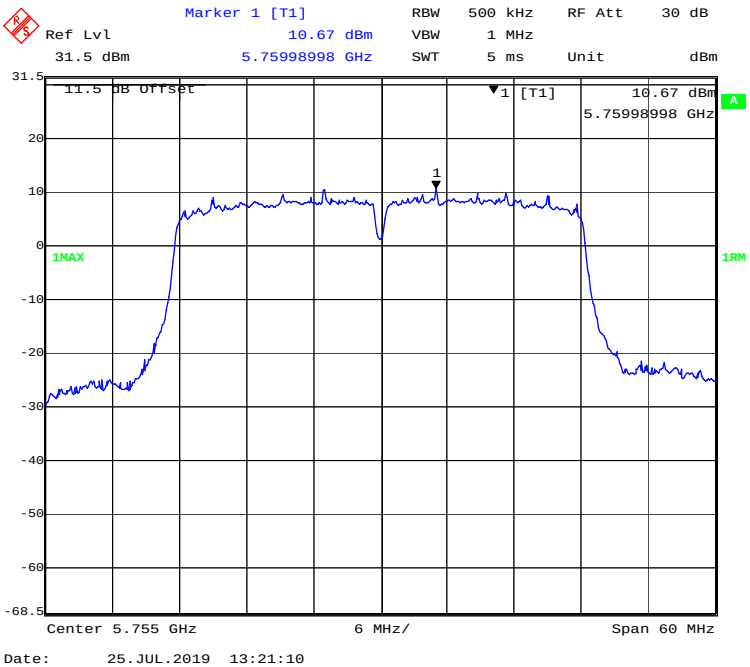
802.11ac40 mode, Power spectral density-5755MHz



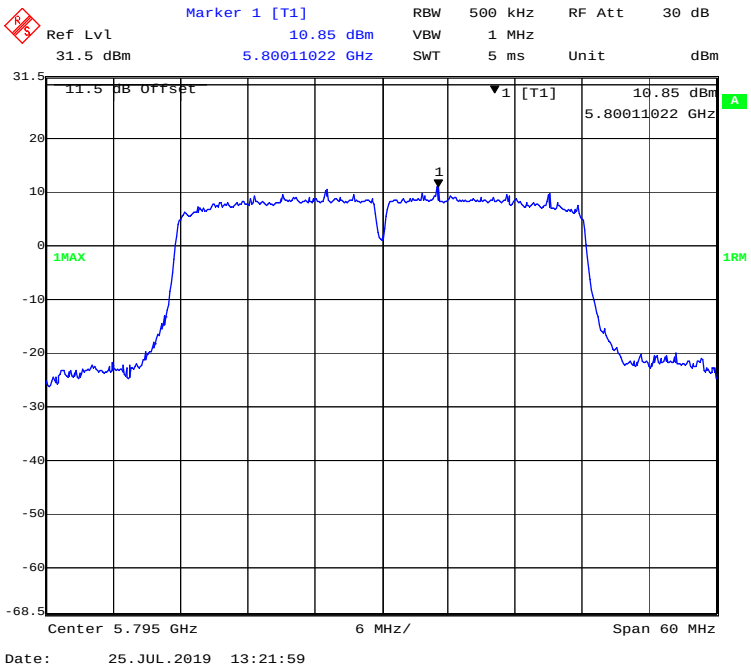
802.11 ac40 mode, Power spectral density-5795MHz



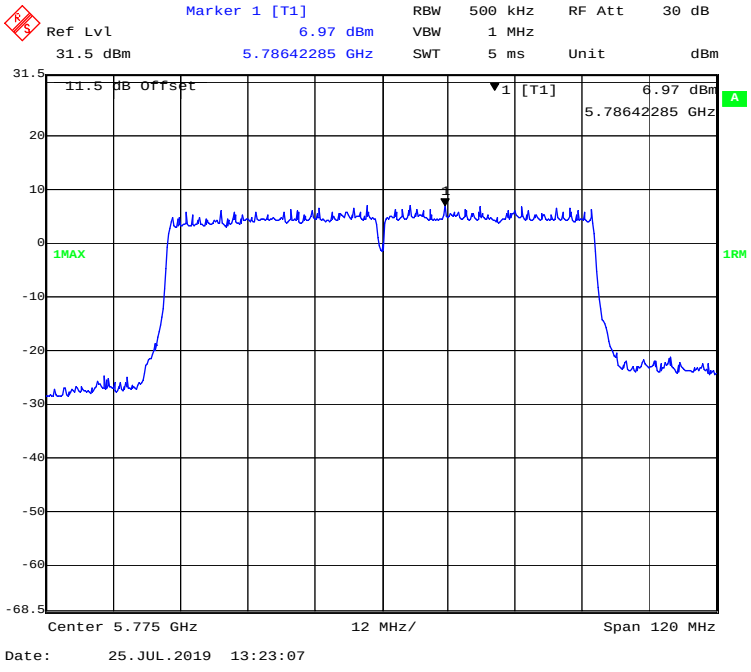
802.11n-HT40 mode, Power spectral density-5755MHz



802.11n-HT40 mode, Power spectral density-5795MHz



802.11 ac80 mode, Power spectral density-5775MHz



******* END OF REPORT *******